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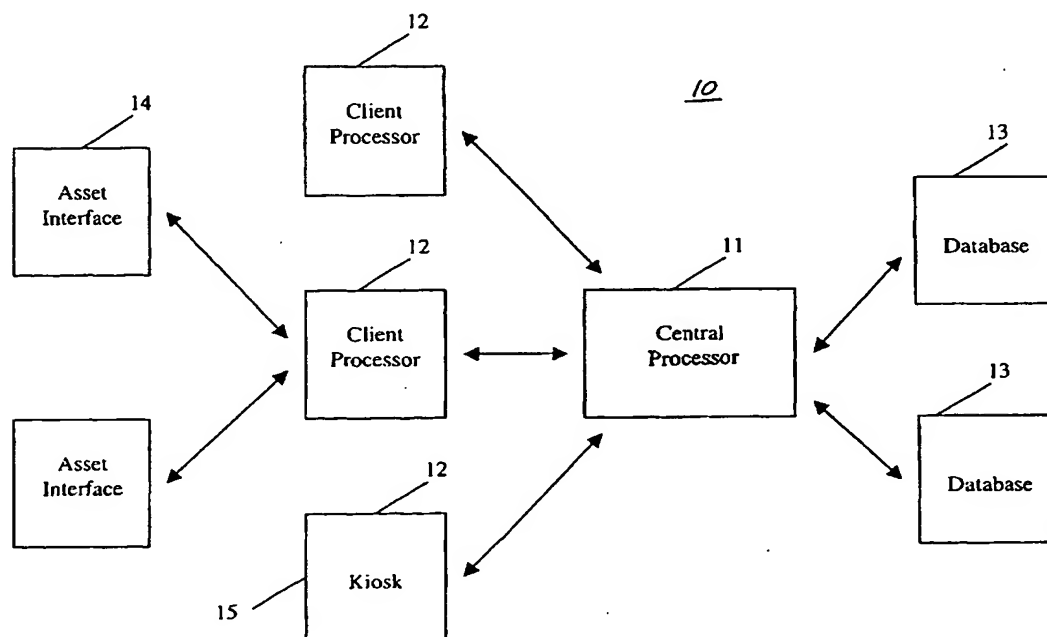
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(54) Title: ENTERPRISE ASSET MANAGEMENT SYSTEM AND METHOD



(57) Abstract: A system (11) and method for managing enterprise assets (14) located at geographically distributed sites. The method includes storing in a database (13) information relating to each asset, wherein the stored information includes cost of each asset and cost of service for each asset. The method further includes tracking and storing information relating to servicing of the assets, including the cost of servicing. Information relating to the assets is then displayed to a user of the system at client processors (12).

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## ENTERPRISE ASSET MANAGEMENT SYSTEM AND METHOD

### CROSS-REFERENCE TO RELATED APPLICATION(S)

This application claims priority from U.S. provisional application numbers  
5 60/212,234, filed June 16, 2000 and 60/288,827, filed May 5, 2001 both of which are  
hereby incorporated by reference in their entirety.

### TECHNICAL FIELD

This invention relates to a method and system for managing enterprise assets.  
More particularly, the invention relates to a method and system for the comprehensive  
10 management of enterprise assets dispersed over a plurality of distributed sites.

### BACKGROUND OF THE INVENTION

It is frequently useful to determine the total cost of ownership (meaning the  
total cost of owning one or more assets) and to track components of the total cost of  
15 ownership for an asset within an enterprise for accounting purposes and for making  
future purchasing decisions. However, tracking costs attributed to each specific asset  
in a large, distributed environment (an enterprise that has many facilities at differing  
locations, as well as one or more central headquarters) can be a difficult task.

A large retail store chain, for instance, may wish to determine the total cost of  
20 ownership for each cash register it owns. A highly distributed retail chain may have  
tens of thousands of cash registers, and in order to calculate a reasonably accurate  
determination of the total cost of ownership the retail chain must accurately track all  
the costs that are incurred for each cash register. The purchase price of an asset,  
repair costs, and maintenance costs are the main components of the total cost of  
25 ownership and so these costs need to be tracked, in some instances other factors such  
as energy costs may also need to be factored into the calculation.

However, tracking costs incurred in repairing and maintaining these assets  
can be an onerous task. In a typical procedure to service assets, a store manager first  
calls a service provider to perform a task on an asset. The service provider performs  
30 the task required, seeks approval for the work, and then fills out work order papers in  
triplicate. The work order papers are typically distributed (one copy each) to the  
enterprise headquarters, the store, and the service provider. The service provider then

creates an invoice and sends it to the enterprise headquarters. If the accounts payable department of the enterprise headquarters can locate the work order papers, the invoice may be entered into the system and paid. If the work order papers cannot be found, the invoice may be sent to the store manager for approval, returned to the enterprise headquarters after approval, and then entered into the accounts payable system.

Tracking part and labor costs in highly distributed enterprises thus becomes very difficult using the existing process described above. Matching paperwork with assets may become exceedingly difficult due to the sheer volume of assets and the large amounts of paperwork generated in servicing and maintaining the assets.

Another potential problem with the process described above is that service providers may be able to overbill for service calls or parts without full knowledge by the enterprise of the nature of the service call. The lack of overview on a regional or national level may prevent an enterprise from determining if the costs incurred by distributed sites for an asset is reasonable.

Because it is time consuming and expensive to collect paper work from numerous sources to even have the capability of accurately calculating the total cost of ownership for an asset, the cost of ownership of many assets is frequently a guess that may vary greatly from the actual cost of ownership. Thus, enterprises frequently determine the cost of ownership for an asset to be the purchase price of the asset, which is typically considerably less than the actual cost of ownership. Moreover, in a highly distributed environment, there are many assets to manage, and current systems do not provide feasible and efficient methods and systems for managing such assets. In particular, current systems do not provide for an efficient manner to determine the costs of servicing and maintaining assets or the total cost of ownership of an asset.

A need exists for a method and system for managing enterprise assets over numerous distributed sites that is user friendly, cost and time efficient, and that may be used to accurately generate the cost of ownership for one or more assets of an enterprise. A need also exists for a common platform that may be used to set up information systems and gather accounting information for managing these assets including total cost of ownership accounting.

## BRIEF SUMMARY OF THE INVENTION

The subject invention is a system and method for comprehensively tracking and monitoring asset information and for calculating a total cost of ownership. The subject invention includes novel means for collecting and storing information about a number of enterprise assets, and further includes novel means for tracking and storing information about repair and maintenance of enterprise assets so that a relatively accurate total cost of ownership can be determined.

In one embodiment, the subject invention includes a web site hosted on a server in communication with a computer network, such as the internet. The embodiment also includes a database in communication with the web site for storing asset information. In this embodiment, various users of the system (e.g., enterprise personnel, service providers, and equipment manufacturers) are allowed differing levels of access to applications located within the web site so that asset information can be easily inputted or downloaded through a client processor or kiosk.

In another embodiment, the subject invention includes a method of managing assets wherein each asset is identified by a particular asset identifier and factors pertaining to each asset are linked to each asset identifier. This embodiment also includes submitting a user request for specific information to a web site and having the website filter the asset information so that the information requested can be displayed on a client computer.

In yet another embodiment, the subject invention includes a method for generating service requests which allows a user, or in some cases, the asset itself to request service electronically. This embodiment includes determining a service provider for the particular asset in need of service, and automatically generating an E-mail message to an appropriate service provider for the asset.

In yet another embodiment, the subject invention also includes a compact menu configuration that allows the various users to quickly and easily navigate the various screens displayed on the client processor. This configuration includes upper and lower horizontally-disposed sections that houses multiple levels of functions while consuming minimal space on the user interface screen.

While several embodiments are disclosed, still other embodiments of the subject invention will become apparent to those skilled in the art from the following detailed description, wherein is shown and described only the embodiments of the

invention, by way of illustration, of the best modes contemplated for carrying out the invention. As will be realized, the invention is capable of modifications in various obvious aspects, all without departing from the spirit and scope of the subject invention. Accordingly, the drawings and detailed description are to be regarded as  
5 illustrative in nature and not restrictive.

### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram showing the various components of the enterprise asset management system, according to one embodiment of the subject invention.

10 Fig. 2 is an embodiment of a screen display for a kiosk.

Fig. 3 is a table displaying one possible set of factor groups and factors.

Fig. 4a is a flow diagram of a service request.

Fig. 4b is an embodiment of a web page for inputting a service request.

Fig. 5 is a web page for screening asset information.

15 Fig. 6 is one embodiment of a GIS map produced by the subject invention.

Fig. 7 is an embodiment of a menu structure shown in progressive states of expansion.

### DETAILED DESCRIPTION OF THE INVENTION

#### 20 A. System Configuration

Fig. 1 shows an embodiment of an asset management system 10 in accordance with one embodiment of the subject invention. This embodiment is comprised of a central processor 11 located at a central location, one or more databases 13 to store asset information, and a plurality of client processors 12 located at a plurality of  
25 remote locations. In one embodiment, the system 10 includes asset interfaces 14 connected directly to particular assets, and one or more kiosks 15 acting as a client processor 12.

The central processor 11 can be any computer known to those skilled in the art, including standard attachments and components thereof (e.g., a disk drive, hard  
30 drive, CD player or network server that communicates with a CPU and main memory, a sound board, a keyboard and mouse, and a monitor). The processor of the CPU in the computer may be any conventional general-purpose single- or multi-chip

microprocessor. In addition, the processor may be any conventional special purpose processor such as a digital signal processor or a graphics processor. The microprocessor has conventional address lines, conventional data lines, and one or more conventional control lines. In one embodiment, the central processor 11

5 includes a website hosted in at least one or more computer servers. These servers may comprise web servers, database servers and/or application servers, and they run on a variety of platforms, including UNIX machines, Windows 2000, Windows NT, and Macintosh.

The central processor 11 includes software programs or instructions that run

10 on the server-side to process requests and responses from a client processor 12. These software programs or instructions send information to the client processor 12, perform compilation and storage functions, generate reports that may be used by either the clients or the headquarters of the enterprise, or carry out asset management functions. The software may be software applications commercially sold and normally used by

15 those skilled in the art or they may be specific applications coded in a standard programming language. Further details of the functions performed by the software are provided below.

The central processor 11 allows access by the client processor to various network resources. In one embodiment, the central processor 11 also has access, via

20 direct dial or the internet, to external data sources, such as manufacturer web pages or manufacturer programs that may be used to keep the information in the server current. A number of client processors 12 may be connected to the server at any given time, and therefore a number of different facilities or service providers may utilize the subject invention simultaneously.

25 The system 10 can also include one or more databases 13 for storing asset information. The database may be of any type generally known in the art. In one embodiment, a scaleable database (e.g., Oracle) is used to allow for expansion as the amount of information tracked increases.

These databases 13 may be integral to the central processor 11 or they may be

30 accessible to the central processor through a computer network or other suitable communication link. The databases 13 servers operated by the system proprietor, and/or may include external databases operated by a remote entity, such as a manufacturer of an asset, that is accessible through a computer network. In one embodiment, the database 13 is comprised of a plurality of database servers, some of

which are integral to the central processor 11, and some that are located remotely from the central processor 11.

The client processor 12 may be any computer or computer systems used by those skilled in the art. The client processor 12 comprises a central processor unit ("CPU") and main memory, an input/output interface for communicating with various databases, files, programs, and networks (such as the Internet), and one or more storage devices. The storage devices may be disk drive devices or CD-ROM devices. The client processor 12 may also have a monitor or other screen device and an input device, such as a keyboard, a mouse, or a touch sensitive screen.

Client processor 12 can be used to place work orders, view asset information, input asset information, change the operational parameters of an asset, exchange data with the central processor, and/or to view and manipulate asset information. In order to enable the user to perform these functions, in one embodiment, the client processor 12 also has some software programs contained in the main memory or the storage devices that can be used by the CPU to perform the above functions. In one embodiment, a web browser such as Netscape Navigator, Microsoft Internet Explorer, Mosaic, or Lynx is included in the client processor to enable the client processor to exchange, interpret, and/or display information accessed via the Internet.

Some client processor 12 can be configured as kiosks 15 and located at one or more remote sites. The kiosks are adapted for use by service providers onsite, to access the central processor 11 to view asset information or service requests. As shown in Fig. 2, these kiosks can include a preconfigured menu which allows service providers to access the central processor 11, to enter and receive information concerning work orders 20, to check if a particular work order has been approved 21, and to check for messages 22. In one embodiment, the kiosks 15 can include magnetic or barcode readers to allow a service provider to swipe an identification card having a bar code or similar identification strip in order to obtain access to the central processing unit 12 or the kiosks 15 may require the input of a secret pin number.

In some embodiments, asset interfaces 14 are attached to assets with communications capabilities in order to monitor and/or control its performance. It is common for certain assets to have ports through which performance characteristics and/or failure signals can be obtained. It is also common for some assets to have bi-directional communication capabilities that enable the asset to be monitored and operated remotely. The asset interface 14 can be configured to communicate with the



asset and to provide a communication link between the asset and a client processor 12 or the central processor 11.

Communication technology, such as a cellular modem, any other wireless communication system, and/or a landline communication system may be used to form  
5 a communication link between the asset interface and a client processor 12 or the central processor 11. Preferably, a wireless technology, such as Cellular Digital Packet Data (CDPD) technology is used to transfer information between the asset interface 14 and a client processor 12 or the central processor 11. CDPD technology may both receive and transmit data quickly and efficiently with minimal error. As an  
10 alternative to or in addition to a wireless communications unit, a land-line telephone connection may also be used.

As shown in Fig. 1, a communication link exists between a client processor 12 and the central processor 11. This link can be achieved through a variety of means commonly known by those with skill in the art. The system and method of the  
15 invention may use the "World Wide Web" ("web" or "WWW"), which is a collection of servers on the Internet that utilize the Hypertext Transfer Protocol ("HTTP"). The Internet is a collection of computer networks that allows computer users to share files and other computer resources. Each computer connected to the Internet has a unique address whose format is defined by the Internet Protocol ("TCP/IP").

20 HTTP is a known application protocol that provides users access to resources, which may be information in different formats such as text, graphics, images, sound, video, Hypertext Markup Language ("HTML"), as well as programs. HTTP allows for the transmission of certain information between the client processor 12 and a server.

25 Upon specification of a link by the user, the client processor 12 makes a TCP/IP request to the central processor 11 and receives information, which may be a "web page" that is formatted according to HTML which also includes links to other pages of information. Users can also access other pages on the same or other database server by following instructions on the screen, entering certain data, or clicking on  
30 selected icons. It should also be noted that any type of selection device known to those skilled in the art, such as check boxes, drop-down boxes, and the like, may be used for embodiments of the invention using web pages to allow a user to select options for a given task.

In one embodiment, the subject invention is a web-site hosted by at least one computer in communication with the internet. This embodiment allows the subject invention to be accessed through a client computer 12 by various types of users located at geographically distributed sites. To limit access to authorized users, in one  
5 embodiment, the subject invention allows for various types of users and users at various distributed sites to have distinct levels of access. For example an enterprise or store user, in one embodiment, has full access to all assets and all pending work orders pertaining to his or her store. A service provider user has access to all assets of a type that he services and all work orders that he is responsible for fulfilling. These  
10 assets may include assets located at various distributed sites and may even include assets owned by distinct enterprises. An equipment manufacturer may have access to the assets at the various distributed sites that it manufactured.

Levels of access can be controlled by specifying securable or configurable attributes for each system user. These attributes can be specified by a system  
15 administrator, who may be an enterprise asset management company or may be with the enterprise itself. In one embodiment, the securable attributes are pre-defined based on the type of user. For example, user can have access to assets based on hierarchical levels within an enterprise. If the user is a regional manager, he will have access to assets in all of the locations of his store within his region. If the user is  
20 manager of a particular location, access may be limited to assets within that particular location.

The user's level of access can also be defined by his assigned roles and rights. Like the user's securable attributes, the user's roles and rights may be pre-specified by using a type of user, such as a "store manager." Based on the user's type, he is given  
25 certain rights and roles. In one example, the rights that are granted or denied include the right to create new users (having access at the current user's level or below), the right to add or modify assets, and the right to submit work orders.

#### **B. Asset Management**

30 The subject invention includes a system and method used to track the costs of assets and to facilitate the servicing of assets. As an initial procedure, the assets of an enterprise may be inventoried and an asset identifier created for each asset to give it a trackable identity. One method for inventorying assets is further discussed below. As shown in Fig. 3, factors to be monitored are also created to enable a determination

of asset information to be stored, and to enable differentiation of asset information. These factors may also be grouped together into factor groups in order to facilitate screening of stored asset information. In order to calculate a total cost of ownership, information such as cost of the asset, repair costs, and maintenance costs are typically stored as factors for each asset.

In order to track repair and maintenance costs and to monitor the servicing of assets, the subject invention includes a system and method for managing the servicing and maintenance of assets by third-party service providers or inhouse personnel. As shown in Fig. 4a, the method generally comprises generating a service request from a client computer (block 40), receiving a service request at the central processor 11 through the web site (block 41), determining a service provider (block 42), automatically transmitting to the service provider the service request and any additional asset information which may be needed by the service provider (block 43), and awaiting a response to the service request (block 44). If no response is received within a predetermined period of time, the electronic message is resent (block 43).

As shown in Fig. 4b, a service request from a user will generate an electronic work order 45 containing information such as the asset to be repaired, location of the asset site, the reported problem, and the asset identifier. Typically, a service request is initiated by enterprise employees located at a remote site through the use of a client computer 12. In some instances, a particular asset may have self-diagnostic programs that can determine a malfunction and generate an error signal. These assets may have asset interfaces 14 interfaced thereto enabling them to generate service requests automatically through a client computer 12.

In one embodiment, an identification of authorized service personnel is maintained in a database and linked to particular assets. Once a service request is processed by the central processor 11, a service provider is determined automatically by determining which service provider is linked to the particular asset and a particular geographic location, and the service provider is notified automatically via an E-mail message or other form of electronic messaging. If the service provider does not respond to an E-mail within a specified period of time, additional E-mails may be sent automatically. The E-mail can include the type of asset requiring service, the reported failure, location, contact person, and prior service history of the asset. In addition, the service provider may also obtain additional information on the asset by accessing the central processor 11 via the internet or a kiosk 15.

After a service request is completed, information pertaining to the repair or maintenance of an asset may be gathered from service providers through the web site or through a client computer 12 or a kiosk 15 and stored in the database 13. For instance, the cost of replacement parts may be inventoried in the database of the system and the service provider may choose, while at the remote location of the facility, the type of replacement part that is used. The cost of this replacement part, therefore, may be allocated to the asset that was repaired. In addition, the cost of the service charge may be ascertained based on the length of the visit of the service provider and this cost of service may be allocated to the repaired asset. The submission of information relating to the service provided can be used to trigger payment for the service.

In order to determine total cost of ownership and to monitor certain asset information, the subject invention also includes a filtering and compilation application that allows the user to filter or compile asset information located within a database 13 so that only desired information is displayed. In one embodiment, a filter operates by prompting a user through a client computer 12 to define criterion for the filtering of asset information, and submitting that definition along with the user's securable attributes, to the central processor 11. The central processor 12 then applies the criterion to the asset information and returns the appropriate data set for viewing by the user at the client.

As shown in Fig. 5, in this embodiment, a first – horizontally disposed section 51 contain sets of tabs defining separate primary categories which can be queried. A second – horizontally disposed section 52 defines subcategories of the primary categories. Selection of a category and a subcategory will cause the display of a formatted query box 50 utilized to set specific user criteria. Once the criteria has been submitted the asset information is displayed in table 53.

Since the maintenance and repair costs as well as purchase price comprise a majority of the total cost of ownership of an asset, a relatively accurate calculation can be obtained by summing up the three. Other factors such as energy costs, performance costs, and other can also be factored into the calculation if these factors are stored for the particular asset. To calculate the total cost of ownership, the total costs for maintenance and repair and the purchase price for an asset or a group of assets is compiled using the filtering procedures above and the values are summed together. In one embodiment of the present invention, the calculation is pre-

programmed into software located in the central processor 11 and the calculation is done automatically by simply selecting the function and inputting the asset identifiers.

### C. Additional Features

5           In a distributed business environment, assets may be distributed over a large geographic region in a large number of separate facilities. As shown in Fig. 6, to track these assets geographically, one embodiment includes an application for creating a Geographic Information System (GIS) map locating a particular asset or a particular group of assets. A set of queries 60 are displayed on a client processor 12  
10           pertaining to an asset or group of assets such as a particular asset type and a desired location. The central processor 11 then generates a map 61 based on the responses to these queries.

          This embodiment can also include a mapping system displaying a single enterprise facility. Icons representing certain types of assets may be dragged and  
15           dropped onto a GIS map of a particular facility in order to display the location of assets within a facility on a scaled map.

          To simplify the use of the subject invention and to maximize the options available to a user, the subject invention typically includes a compact menu structure for navigating the various functions included within the central processor 11. As  
20           shown in Fig. 4b, this menu structure may include information pertaining to the enterprise assets, the service history, and pending work orders. Because of the limited space available on the display screen of the client processor 12, it is essential that the navigational technique consume little space, while maintaining full functionality and ease-of-use.

25           As shown in Fig. 7, in one embodiment, the compact menu structure includes two narrow, horizontally-extending sections of the client display. The upper section 70 includes a tab-based menu that provides the main level of navigation and a lower section 71 that provides all the subsections within a selected main level of navigation. A subsection having further levels of subsections have a visual indicator adjacent  
30           thereto to signify as such. In one embodiment this visual indicator is an arrow 72 located beneath the subsection, selecting any subsection having further levels will cause the lower section 71 to display all the subsections in the previously selected subsection.

For example, in one embodiment, the main navigational sections (shown in Fig. 5) include, "Sites," "Service & Maintenance," "Asset Types," "Service Providers," "Manufacturers," "Reports," and "Messages." Selection of one of these main navigational sections determines what appears on the second section. For  
5 example, in one embodiment, if the "Sites" tab is selected, the second section starts off, on the left, with a "Sites" indicator. To the right of the "Sites" indicator now appears the various subsections under the Sites portion of the menu.

In another embodiment, the main navigational levels are highlighted in the upper section and are not repeated in the lower section. In this embodiment, the lower  
10 section only includes the subsection under the main navigational section. For example, in one embodiment, the subsections under "Sites" includes, "sites" and "organizations." If the user now selects "organizations," an "organizations" indicator appears in the lower section and the subsections to "organizations" appear to the right, in the lower section. In one embodiment, the subsections under "organizations"  
15 include "summary," "address," and "roster profile." If the user selected the "address" subsection, the lower section will now contain an "organizations" indicator, followed by an "address" indicator, followed by the "address" subsections. This process continues down as many levels as is needed. This menu structure allows the users to quickly and efficiently navigate between various forms and lists of the enterprise asset  
20 management system, while consuming a narrow band on the client display.

While the subject invention has been described with reference to several embodiments thereof, those skilled in the art will recognize various changes that may be made without departing from the spirit and scope of the claimed invention. Accordingly, this invention is not limited to what is shown in the drawings and  
25 described in the specification but only as indicated in the appended claims, nor is the claimed invention limited in applicability to one type of computer or computer network. Any numbering or ordering of elements in the following claims is merely for convenience and is not intended to suggest that the ordering of the elements of the claims has any particular significance other than that otherwise expressed by the  
30 language of the claims.

## CLAIMS

We claim:

1. A system for managing a plurality of assets of a plurality of distributed enterprises and allowing a user to access asset information, the system comprising:

5 a central processor; and

a database for storing asset information for the plurality of assets of the plurality of enterprises, the database in communication with the central processor;

wherein the central processor tracks information relevant to managing each of the plurality of assets.

10 2. The system of claim 1, wherein the central processor includes a website hosted by at least one computer in communication with a computer network through a communication link.

15 3. The system of claim 1, further comprising a client processor in communication with the central processor through the communication link.

4. The system of claim 1, wherein the database stores asset information in the form of pages which in turn contain links to other pages.

20 5. The system of claim 1, wherein the central processor automatically generates an E-mail message to a service provider in response to a service request by the user.

6. The system of claim 2, wherein the client processor inputs, queries, and downloads asset information from the central processor through a web browser.

25 7. The system of claim 6, wherein the central processor is programmed with code for utilizing a user profile, including securable attributes, to limit access to particular asset information.

30 8. The user of claim 7, wherein the user profile specifies sites at which the user may access asset information.

9. The system of claim 7, wherein the central processor is programmed with code for organizing asset information in accordance with the user's request.
10. The system of claim 1, wherein the central processor is programmed with code for generating a GIS map locating one of the plurality of enterprise assets.
11. The system of claim 1, wherein the central processor is programmed with code for determining an appropriate service provider for a particular asset and alerting the service provider of a service request.
12. The system of claim 11, further comprising an asset interface in communication with the client processor.
13. The system of claim 12, wherein the central processor is programmed with code for establishing a communication link with the asset interface through the client processor.
14. The system of claim 13, wherein the asset interface communicates with the client processor through a wireless communication modality.
15. The system of claim 1, wherein the central processor is programmed with code to calculate a total cost of ownership for a particular asset or group of assets.
16. The system of claim 1, wherein the database includes at least one database server in communication with a computer network.
17. The system of claim 1, wherein the user is an agent of the enterprise.
18. The system of claim 1, wherein the user is a service provider.
19. The system of claim 1, wherein the user is an equipment manufacturer.



20. A system for managing enterprise assets of a highly distributed enterprise, the system comprising:

a website hosted by at least one computer in communication with a computer network;  
and

5 a client processor, including a web browser, in communication with the website through the computer network;

wherein the at least one computer tracks information relevant to determining a total cost of ownership for each asset.

10 21. The system of claim 20, and further comprising at least one database server in communication with the website, the database server having asset information stored therein in the form of pages, with some pages including links to other pages of information.

15 22. The system of claim 21, and further comprising a client processor in communication with the central processor and an asset interface in communication with the client processor.

23. The system of claim 22, wherein the website is programmed with code for communicating with the asset interface through the client processor.

20 24. The system of claim 23, wherein the asset interface includes a means for taking operative control of a particular asset.

25 25. The system of claim 20, wherein the website is programmed with code for selectively filtering asset information based on user specified criteria.

26. The system of claim 20, wherein the website is programmed with code for calculating a total cost of ownership.

30 27. The system of claim 20, wherein the website is programmed with code for utilizing a user profile, including securable attributes, to limit access to particular applications and to particular asset information.

28. The system of claim 20 wherein the website includes pictorial displays of each individual asset.

29. The system of claim 20, wherein the client processor is a kiosk located at an enterprise site.

30. A method of managing enterprise assets of a highly distributed enterprise, the method comprising:

10       creating an asset identifier corresponding to each of the plurality of assets for each individual asset;  
      specifying factors to be monitored for each asset identifier;  
      storing asset information pertaining to a factor for each asset identifier in a database;  
      receiving user specified requests for asset information from a client processor at a remote site; and  
15       transmitting the requested asset information to the client processor.

31. The method of claim 30, and further comprising the additional step of providing a web site in communication with a computer network for communicating with a client processor.

20 32. The method of claim 31, and further comprising the additional step of creating a GIS map based on the user specified request.

33. The method of claim 31, and further comprising the additional step of filtering asset information based on the user specified request.

25 34. The method of claim 31, and further comprising the additional step of calculating a total cost of ownership for an asset or a group of assets based on the user specified request.

30 35. The method of claim 31, and further comprising the additional step of inputting asset information from a client processor at a remote site.

36. The method of claim 31 wherein asset information is stored in the form of pages containing links to other pages.

37. The method of claim 31, and further comprising the additional step of filtering asset information transmitted to a particular user based on predetermined levels of access.

38. A method of generating service requests in a highly distributed enterprise to a plurality of service providers from a plurality of distributed asset sites, the method comprising:

providing a website hosted by at least one server computer in communication with a computer network, the website including a database containing asset information and service provider information;

receiving a service request at the website for an asset;

automatically selecting an appropriate service provider based on the asset to be serviced; and

generating an electronic message to the appropriate service provider requesting service.

39. The method of claim 38, and further comprising the additional steps of creating a log listing service requests, and generating additional electronic messages to the service provider if no response has been forthcoming.

40. The method of claim 38, wherein the electronic message is an E-mail.

41. The method of claim 40, and further comprising the additional step of attaching asset information onto the E-mail.

42. The method of claim 41, and further comprising the additional step of attaching a link to a web page onto the E-mail.

43. The method of claim 38, and further comprising the additional step of receiving a service report at the website from a service provider.

44. The method of claim 43, and further comprising the additional step of storing asset information in the service report under an appropriate factor.

45. The method of claim 38, wherein the service request is generated automatically by an asset interface through a client computer in communication with a computer network.

46. A menu structure for a software application comprising:  
a first horizontally-disposed section, the first section including a plurality of main navigational categories; and  
a second horizontally-disposed section, the second section displaying an indication of subcategories for a selected main navigational category.

47. The menu structure of claim 46, wherein selection of a subcategory on the second horizontally-disposed section will cause the display of a second set of subcategories on the second section.

48. The menu structure of claim 47, wherein the second section further includes a menu indication in visual association with each subcategory that is a menu subcategory.

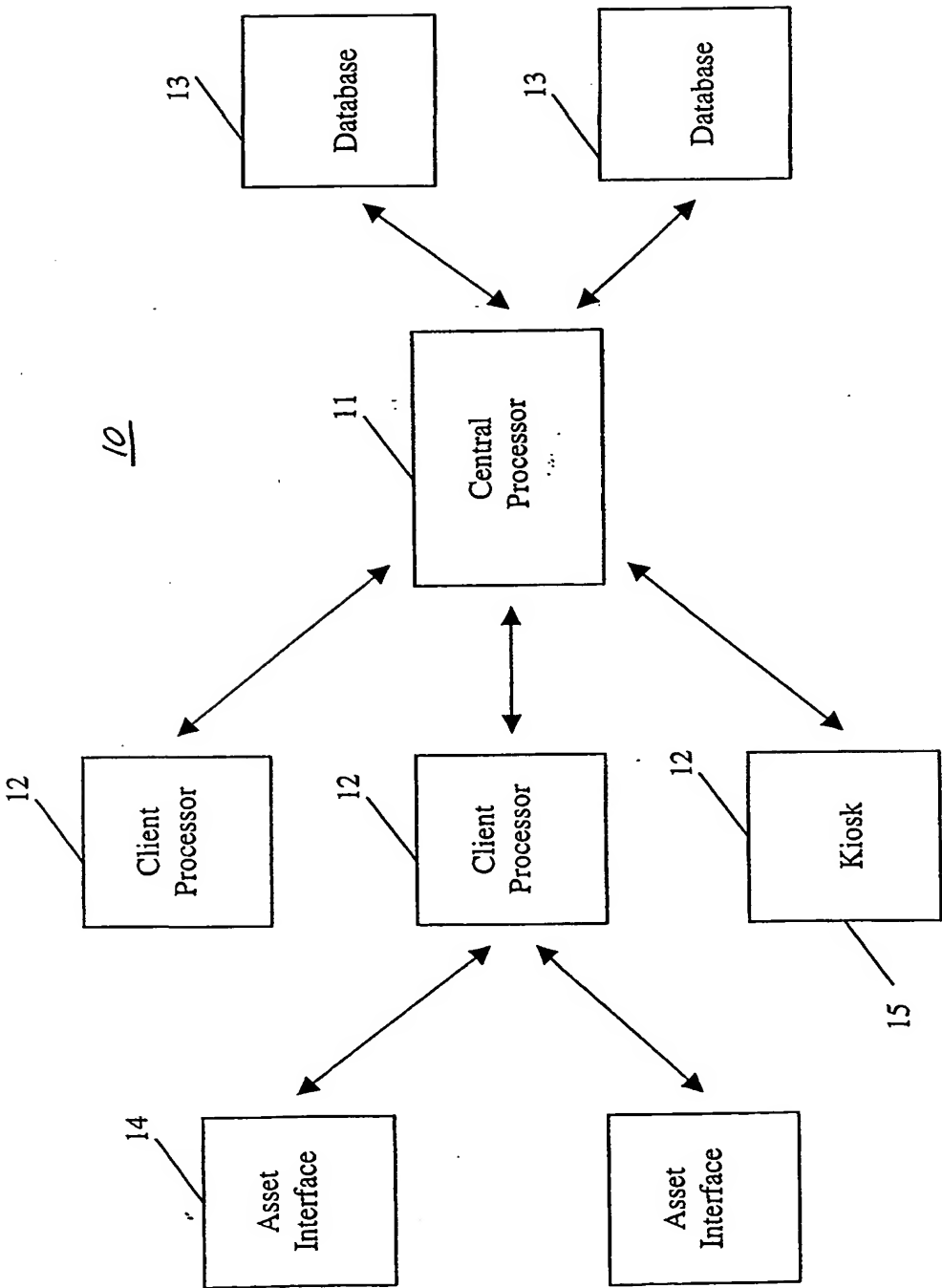


Fig. 1

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20

21

15

**T-0664** 4175 Vinewood Lane N.

Welcome
Work Orders
Approvals
Messages
Log-Out


 Info

**Western Electric TRAVEL CHARGES**

Your service provider profile indicates:

- Charge for Drive Time
- Charge for mileage from portal to portal

For instructions on how to use this kiosk for help at any time, simply touch the information button below.



If you are encountering difficulties with this kiosk, please call Vensae Customer Service at 1-888-888-8888.

**Indicate travel charges, then touch Next to continue**

Your drive time: (HH:MM)

00:30

+


-


Your mileage:

15

+

-

 Next

 Walk Away

**Tom Jackson**

1 scheduled work orders

Not in a service visit. Please start your service visit by entering any charge information and pressing the next button.

Fig. 2

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## Verisae Roles - Master Filter Factor Groups, Factors, Values & Defaults

Factor Group = A grouping of fields that are related in concept and can have one or more Factors.

Factor = A Field that we allow the user to assign a value to that will be used in filtering the information displayed in the Work Space.

Value = One of the acceptable values for any given field. Used as the value in query for the Master Filter

Factor Groups & Factors	Value Type	Default / Possible	Edit Yes/No/Down
<b>+ Geography</b>			
Country	Possible Values	Blank / Show All	Yes
State/Province	Possible Values	Blank / Show All	Yes
City	Possible Values	Blank / Show All	Yes
Postal Code	Possible Values	Blank / Show All	Yes
<b>+ Organizational</b>			
Client	Possible Values	Blank / Show All	Yes
Organization	Possible Values	Blank / Show All	Yes
Affiliate	Possible Values	Blank / Show All	Yes
Fact Type	Possible Values	Blank / Show All	Yes
Site	Possible Values	Blank / Show All	Yes
<b>+ Service Provider</b>			
SP Organization	Possible Values	Blank / Show All	Yes
SP Site	Possible Values	Blank / Show All	Yes
Preferred (Y/N)	Possible Values	Blank / Show All	Yes
<b>+ Work Order</b>			
Number	Possible Values	Blank / Show All	Yes
Status	Possible Values	Blank / Show All	Yes
Type	Possible Values	Blank / Show All	Yes
Date Created Range	Start Date, End Date	Blank / Show All	Yes
Date Completed Range	Start Date, End Date	Blank / Show All	Yes
Technician	Possible Values	Blank / Show All	Yes
Part Number	Possible Values	Blank / Show All	Yes
Service Action	Possible Values	Blank / Show All	Yes
Billable Labor Range	Low Value, High Value	Blank / Show All	Yes
Work Order Cost Range	Low Value, High Value	Blank / Show All	Yes
<b>+ Service Visit</b>			
Number	Possible Values	Blank / Show All	Yes
Number of Trips	Possible Values	Blank / Show All	Yes
Service Visit Cost Range	Low Value, High Value	Blank / Show All	Yes
<b>+ Invoice</b>			
Number	Possible Values	Blank / Show All	Yes
Status	Possible Values	Blank / Show All	Yes
Date Created Range	Start Date, End Date	Blank / Show All	Yes
Invoice Cost Range	Low Value, High Value	Blank / Show All	Yes
<b>+ Assets</b>			
Asset Type	Possible Values	Blank / Show All	Yes
Work Center	Possible Values	Blank / Show All	Yes
In Service Date Range	Start Date, End Date	Blank / Show All	Yes
Warranty Expiration Date Range	Start Date, End Date	Blank / Show All	Yes
Preventative Maintenance (Y/N)	Possible Values	Blank / Show All	Yes
<b>+ Manufacturer</b>			
Manufacturer Site	Possible Values	Blank / Show All	Yes
<b>+ Calls</b>			
Call Status	Possible Values	Blank / Show All	Yes
Action Type	Possible Values	Blank / Show All	Yes
Reason Type	Possible Values	Blank / Show All	Yes
Call Date Range	Start Date, End Date	Blank / Show All	Yes

Fig. 3

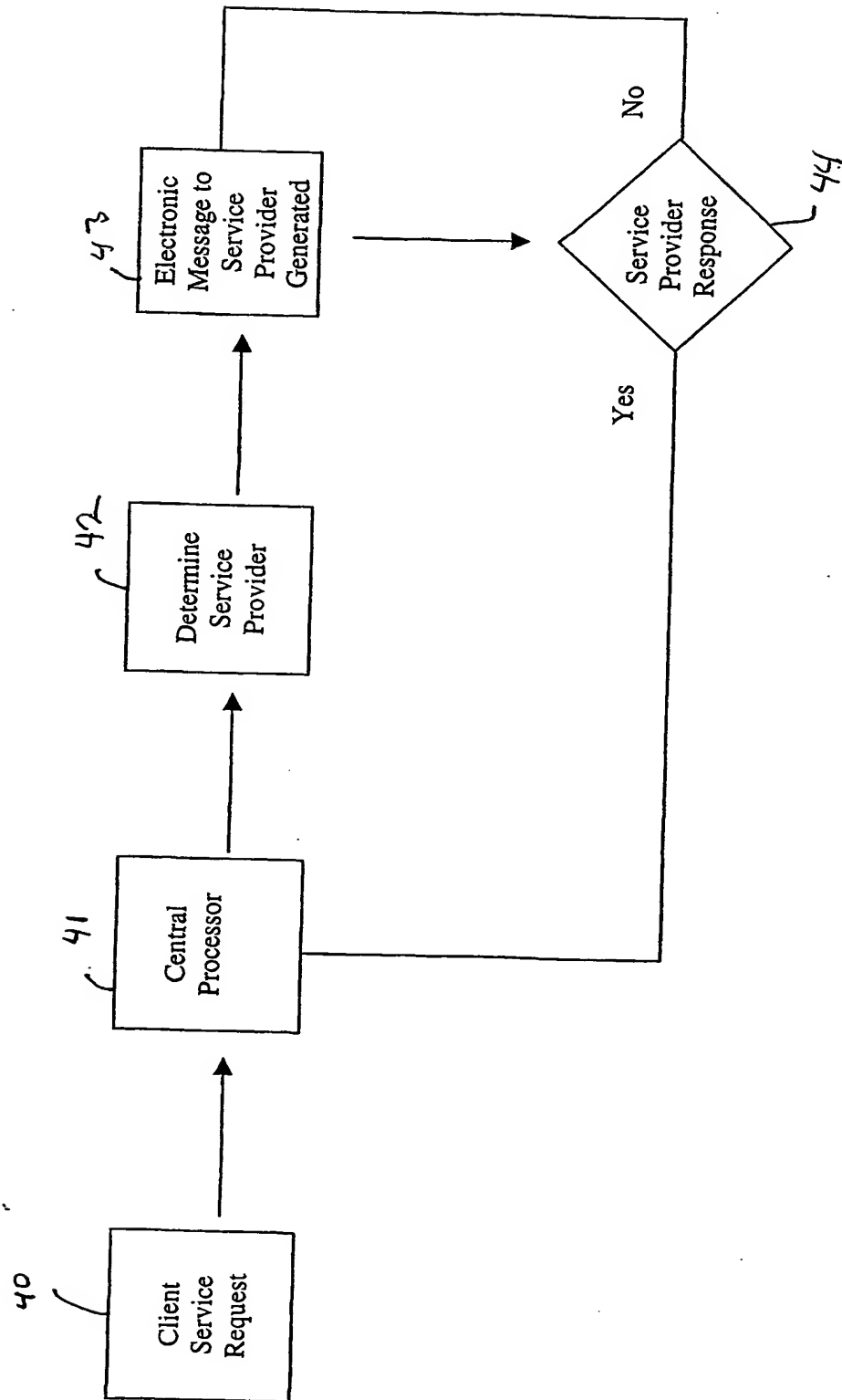


Fig. 4a



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Active Call

Site

T-0664

Requester

Terry Houghten

Description

Lack of power. Battery appears not be recharging.

Reason Type

Out of Service

Asset Type

Dane QuickKart 4000

Asset Number

1854

Serial Number

0059

Action Type

Create Work Order


Status

Open

Save

WO

New



Workspace

Filter Definition

Sites

Service & Maintenance

Asset Types

Service Providers

Manufacturers

Reports

Messages

All Work Orders

Summary

New Work Order

New Work Order

Site Name

T-0664

Requester

Terry Houghten

Asset Type

Dane QuickKart 4000

Verisac Tag Number

1854

Work Order Name

Lack of power. Batt

Work Order Description

Lack of power. Battery appears not be recharging.

Due Date

02/01/2001

Service Provider

Western Electric

Technician

Save

Cancel

45

Verisac Enterprise Asset Management & Maintenance System

Marge Aster

Fig. 4b

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**Active Call**

Site: T-0664

Requester: Terry Naughton

Description: Lack of power. Battery appears not be recharging.

Reason Type: Out of Service

Asset Type: Dana QuickKart 4000

Asset Number: 1854

Serial Number: 0059

Action Type: Create Work Order

Status: Open

**Workspace** Filter Definition

Sites: Service & Maintenance | Asset Types: Service Providers | Manufacturers: Reports | Messages

Outstanding Work Orders | Approvals | All Work Orders | Service Calls | Invoices | Payables | Generate All Work Orders

**All Work Orders**

Status	Site Name	Order Number	Work Order Items	Asset Type	Service Provider
Due 01/25/2001	T-0001	71	LP Tire out of align	Dana QuickKart 4000	Western Electric
Due 01/27/2001	T-0024	72	LP Tire out of align	Dana QuickKart 4000	Western Electric
Due 01/28/2001	T-0100	73	the qt is broke	Dana QuickKart 4000	Western Electric
Overdue	T-0100	63	Remote Intermittent	Dana QuickKart 2000	Western Electric
Overdue	T-0100	62	Left tire flat	Dana QuickKart 2000	Western Electric
Overdue	T-0100	59	Remote not working	Dana QuickKart 2000	Western Electric
Overdue	T-0100	64	Remote not working	Dana QuickKart 2000	Western Electric
Overdue	T-0664	74	Lack of power	Dana QuickKart 4000	Western Electric
Overdue	T-0664	67	Quick Kart is Broken	Dana QuickKart 4000	Western Electric
Overdue	T-0664	58	Rampage broken	Dana QuickKart 4000	Western Electric
Overdue	T-0664	58	Lift strut leaking h	Crown Walkie Backer	Morrison west
Overdue	T-0664	61	Steering wheel loose	Dana QuickKart 4000	Morrison west
Overdue	T-0664	60	Rear hitch broken	Dana QuickKart 4000	Western Electric
Overdue	T-0664	65	Remote not working	Dana QuickKart 4000	Western Electric
Overdue	T-0664	66	Flu It	Dana QuickKart 4000	Western Electric

← Create new work order

**Verisae**

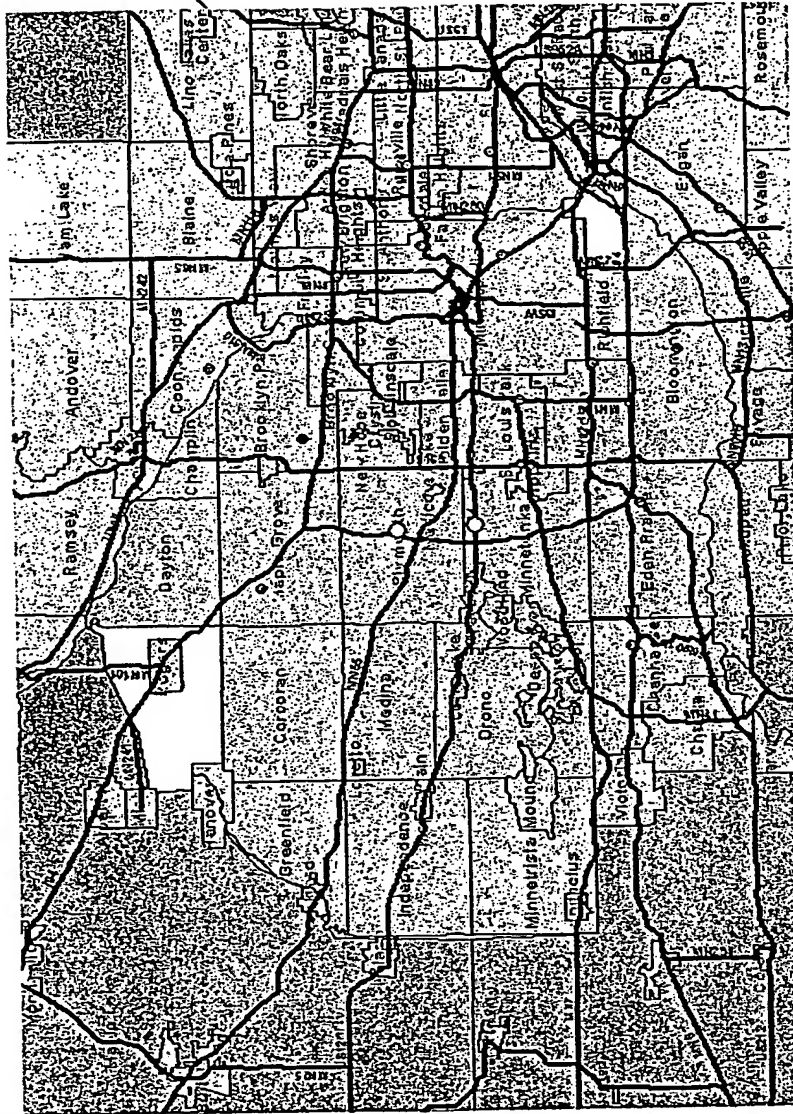
Verisae Enterprise Asset Management & Maintenance System: Marge Aster

Fig. 5

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Workspace GIS Mapping

Please click on the map to select a store. (The YELLOW points are sites which meet your criteria)



There are 10 stores located in Hennepin County. Of which, 2 stores meet your criteria.

Qualified Sites

T-0664 ☒ Selected  
T-0100 ☐  
T-0564 ☐

GIS Criteria

State:

Asset Type:

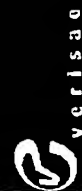
Operand:

Equals:

Number of Assets:

Affiliation:

Submit



Verisao Enterprise Asset Management & Maintenance System (Manfred McConnell)

Fig. 6

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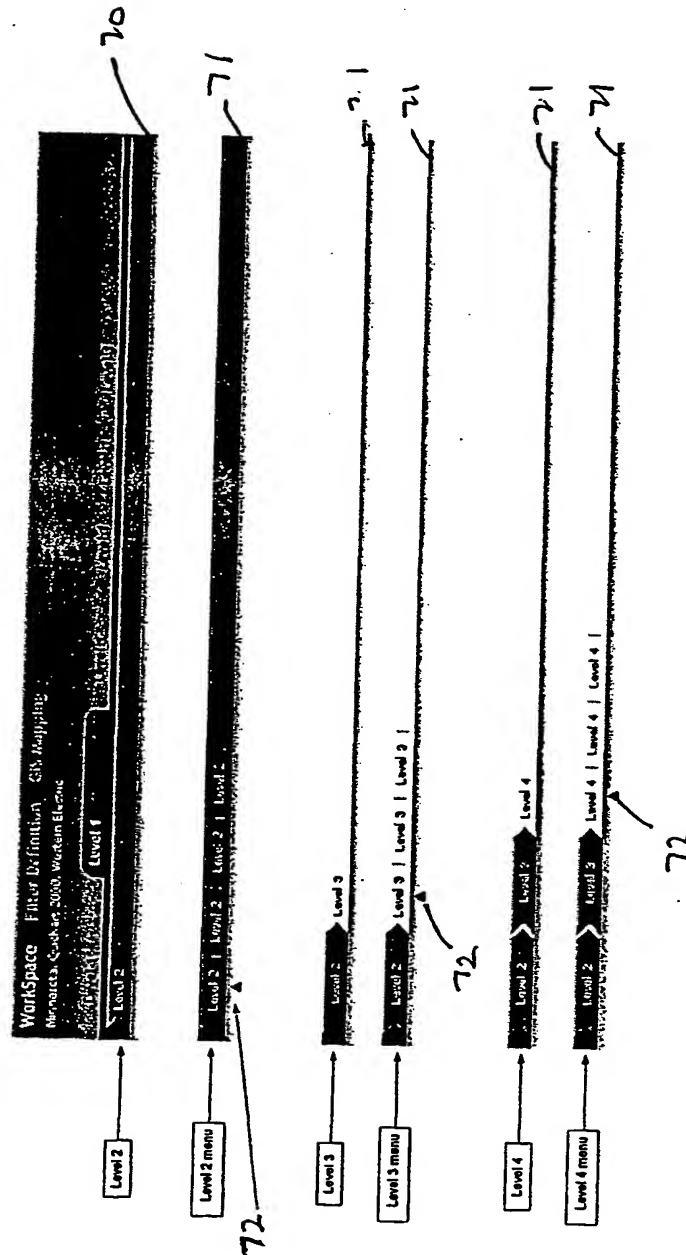


Fig. 7

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US01/19491

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC(7) : G06F 17/60, 13/10, 13/12, 9/44, 9/45, 15/173, 15/16

US CL : 703/21, 22; 709/201, 218, 220, 223; 705/28, 22, 8

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 703/21, 22; 709/201, 218, 220, 223; 705/28, 22, 8

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
Please See Continuation Sheet**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,845,265 A (WOOLSTON) 01 December 1998 (01.12.98), Abstract, Figures 1-13, col. 1, lines 34 et seq.	1-48
X	US 5,946,662 A (ETTL et al.) 31 August 1999 (31.08.1999), Abstract, Figures 1-7, col. 1, lines 56 et seq.	1-48
X	US 5,980,090 A (ROYAL, Jr. et al.) 09 November 1999 (09.11.1999), Abstract, 1-7B, col. 2, lines 8 et seq.	1-48
X	US 5,821,937 A (TONELLI et al.) 13 October 1998 (13.10.1998), Abstract, Figures 1-56, col. 2, lines 25 et seq.	1-48
X	US 5,831,610 A (TONELLI et al.) 03 November 1998 (03.11.1998), Abstract, Figures 1-45, col. 2, lines 10 et seq.	1-48
X	US 5,758,126 A (DANIELS et al.) 26 May 1998 (26.05.1998), Abstract, Figures 1-6, col. 2, lines 41 et seq.	1-48
X	US 5,748,956 A (LAFFER et al.) 5 May 1998 (05.05.1998), Abstract, Figures 1-7, col. 2, lines 50 et seq.	1-48
X	US 5,537,313 A (PIRELLI) 16 July 1996 (16.07.1996), Abstract, Figures 2-4B, col. 4, lines 26 et seq.	1-48
X	US 5,752,244 A (ROSE et al.) 12 May 1998 (12.05.1998), Abstract, Figures 1-21, col. 1, lines 62 et seq.	1-48

☒ Further documents are listed in the continuation of Box C.☐ See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&amp;"

document member of the same patent family

Date of the actual completion of the international search

08 September 2001 (08.09.2001)

Date of mailing of the international search report

23 NOV 2001

Name and mailing address of the ISA/US

Commissioner of Patents and Trademarks  
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Telephone No. 703-305-9704

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US01/19491

## C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,923,850 A (BARROUX) 13 July 1999 (13.07.1999), Abstract, Figures 1-1B, col. 2, lines 66 et seq.	1-48

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US01/19491

## Continuation of B. FIELDS SEARCHED Item 3:

IEEE, ACM and EAST Databases

search terms: asset, management, inventory, optimize, internet, enterprise, network





## CORRECTED VERSION

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International Bureau



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PCT

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(30) Priority Data:  
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60/288,827 5 May 2001 (05.05.2001) US

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(72) Inventors; and

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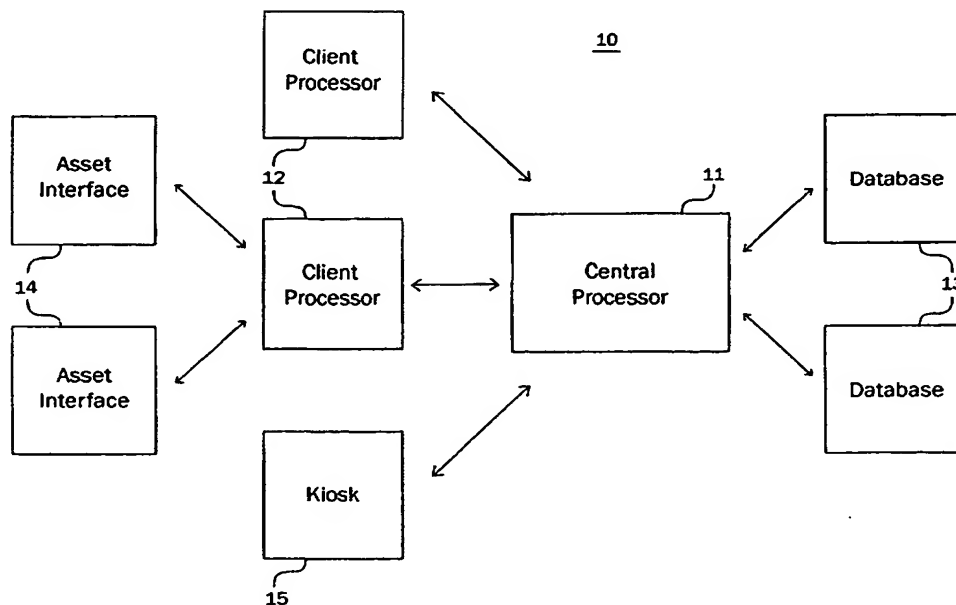
(74) Agents: **KRAUS, Jason, R.** et al.; Dorsey & Whitney LLP, Pillbury Center South, 220 South Sixth Street, Minneapolis, MN 55402 (US).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

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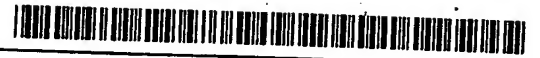
[Continued on next page]

(54) Title: ENTERPRISE ASSET MANAGEMENT SYSTEM AND METHOD



(57) Abstract: A system (11) and method for managing enterprise assets (14) located at geographically distributed sites. The method includes storing in a database (13) information relating to each asset, wherein the stored information includes cost of each asset and cost of service for each asset. The method further includes tracking and storing information relating to servicing of the assets, including the cost of servicing. Information relating to the assets is then displayed to a user of the system at client processors (12).

WO 01/097146 A1



IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

**(15) Information about Correction:**

see PCT Gazette No. 02/2003 of 9 January 2003, Section II

**Published:**

— *with international search report*

**(48) Date of publication of this corrected version:**

9 January 2003

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

## **ENTERPRISE ASSET MANAGEMENT SYSTEM AND METHOD**

### **CROSS-REFERENCE TO RELATED APPLICATION(S)**

This application claims priority from U.S. provisional application numbers  
5 60/212,234, filed June 16, 2000 and 60/288,827, filed May 5, 2001 both of which are  
hereby incorporated by reference in their entirety.

### **TECHNICAL FIELD**

This invention relates to a method and system for managing enterprise assets.  
More particularly, the invention relates to a method and system for the comprehensive  
10 management of enterprise assets dispersed over a plurality of distributed sites.

### **BACKGROUND OF THE INVENTION**

It is frequently useful to determine the total cost of ownership (meaning the  
total cost of owning one or more assets) and to track components of the total cost of  
15 ownership for an asset within an enterprise for accounting purposes and for making  
future purchasing decisions. However, tracking costs attributed to each specific asset  
in a large, distributed environment (an enterprise that has many facilities at differing  
locations, as well as one or more central headquarters) can be a difficult task.

A large retail store chain, for instance, may wish to determine the total cost of  
20 ownership for each cash register it owns. A highly distributed retail chain may have  
tens of thousands of cash registers, and in order to calculate a reasonably accurate  
determination of the total cost of ownership the retail chain must accurately track all  
the costs that are incurred for each cash register. The purchase price of an asset,  
repair costs, and maintenance costs are the main components of the total cost of  
25 ownership and so these costs need to be tracked, in some instances other factors such  
as energy costs may also need to be factored into the calculation.

However, tracking costs incurred in repairing and maintaining these assets  
can be an onerous task. In a typical procedure to service assets, a store manager first  
calls a service provider to perform a task on an asset. The service provider performs  
30 the task required, seeks approval for the work, and then fills out work order papers in  
triplicate. The work order papers are typically distributed (one copy each) to the  
enterprise headquarters, the store, and the service provider. The service provider then

creates an invoice and sends it to the enterprise headquarters. If the accounts payable department of the enterprise headquarters can locate the work order papers, the invoice may be entered into the system and paid. If the work order papers cannot be found, the invoice may be sent to the store manager for approval, returned to the enterprise headquarters after approval, and then entered into the accounts payable system.

Tracking part and labor costs in highly distributed enterprises thus becomes very difficult using the existing process described above. Matching paperwork with assets may become exceedingly difficult due to the sheer volume of assets and the large amounts of paperwork generated in servicing and maintaining the assets.

Another potential problem with the process described above is that service providers may be able to overbill for service calls or parts without full knowledge by the enterprise of the nature of the service call. The lack of overview on a regional or national level may prevent an enterprise from determining if the costs incurred by distributed sites for an asset is reasonable.

Because it is time consuming and expensive to collect paper work from numerous sources to even have the capability of accurately calculating the total cost of ownership for an asset, the cost of ownership of many assets is frequently a guess that may vary greatly from the actual cost of ownership. Thus, enterprises frequently determine the cost of ownership for an asset to be the purchase price of the asset, which is typically considerably less than the actual cost of ownership. Moreover, in a highly distributed environment, there are many assets to manage, and current systems do not provide feasible and efficient methods and systems for managing such assets. In particular, current systems do not provide for an efficient manner to determine the costs of servicing and maintaining assets or the total cost of ownership of an asset.

A need exists for a method and system for managing enterprise assets over numerous distributed sites that is user friendly, cost and time efficient, and that may be used to accurately generate the cost of ownership for one or more assets of an enterprise. A need also exists for a common platform that may be used to set up information systems and gather accounting information for managing these assets including total cost of ownership accounting.

## BRIEF SUMMARY OF THE INVENTION

The subject invention is a system and method for comprehensively tracking and monitoring asset information and for calculating a total cost of ownership. The subject invention includes novel means for collecting and storing information about a number of enterprise assets, and further includes novel means for tracking and storing information about repair and maintenance of enterprise assets so that a relatively accurate total cost of ownership can be determined.

In one embodiment, the subject invention includes a web site hosted on a server in communication with a computer network, such as the internet. The embodiment also includes a database in communication with the web site for storing asset information. In this embodiment, various users of the system (e.g., enterprise personnel, service providers, and equipment manufacturers) are allowed differing levels of access to applications located within the web site so that asset information can be easily inputted or downloaded through a client processor or kiosk.

In another embodiment, the subject invention includes a method of managing assets wherein each asset is identified by a particular asset identifier and factors pertaining to each asset are linked to each asset identifier. This embodiment also includes submitting a user request for specific information to a web site and having the website filter the asset information so that the information requested can be displayed on a client computer.

In yet another embodiment, the subject invention includes a method for generating service requests which allows a user, or in some cases, the asset itself to request service electronically. This embodiment includes determining a service provider for the particular asset in need of service, and automatically generating an E-mail message to an appropriate service provider for the asset.

In yet another embodiment, the subject invention also includes a compact menu configuration that allows the various users to quickly and easily navigate the various screens displayed on the client processor. This configuration includes upper and lower horizontally-disposed sections that houses multiple levels of functions while consuming minimal space on the user interface screen.

While several embodiments are disclosed, still other embodiments of the subject invention will become apparent to those skilled in the art from the following detailed description, wherein is shown and described only the embodiments of the

invention, by way of illustration, of the best modes contemplated for carrying out the invention. As will be realized, the invention is capable of modifications in various obvious aspects, all without departing from the spirit and scope of the subject invention. Accordingly, the drawings and detailed description are to be regarded as  
5 illustrative in nature and not restrictive.

### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram showing the various components of the enterprise asset management system, according to one embodiment of the subject invention.

10 Fig. 2 is an embodiment of a screen display for a kiosk.

Fig. 3 is a table displaying one possible set of factor groups and factors.

Fig. 4a is a flow diagram of a service request.

Fig. 4b is an embodiment of a web page for inputting a service request.

Fig. 5 is a web page for screening asset information.

15 Fig. 6 is one embodiment of a GIS map produced by the subject invention.

Fig. 7 is an embodiment of a menu structure shown in progressive states of expansion.

### DETAILED DESCRIPTION OF THE INVENTION

#### 20 A. System Configuration

Fig. 1 shows an embodiment of an asset management system 10 in accordance with one embodiment of the subject invention. This embodiment is comprised of a central processor 11 located at a central location, one or more databases 13 to store asset information, and a plurality of client processors 12 located at a plurality of  
25 remote locations. In one embodiment, the system 10 includes asset interfaces 14 connected directly to particular assets, and one or more kiosks 15 acting as a client processor 12.

The central processor 11 can be any computer known to those skilled in the art, including standard attachments and components thereof (e.g., a disk drive, hard  
30 drive, CD player or network server that communicates with a CPU and main memory, a sound board, a keyboard and mouse, and a monitor). The processor of the CPU in the computer may be any conventional general-purpose single- or multi-chip

microprocessor. In addition, the processor may be any conventional special purpose processor such as a digital signal processor or a graphics processor. The microprocessor has conventional address lines, conventional data lines, and one or more conventional control lines. In one embodiment, the central processor 11  
5 includes a website hosted in at least one or more computer servers. These servers may comprise web servers, database servers and/or application servers, and they run on a variety of platforms, including UNIX machines, Windows 2000, Windows NT, and Macintosh.

The central processor 11 includes software programs or instructions that run  
10 on the server-side to process requests and responses from a client processor 12. These software programs or instructions send information to the client processor 12, perform compilation and storage functions, generate reports that may be used by either the clients or the headquarters of the enterprise, or carry out asset management functions. The software may be software applications commercially sold and normally used by  
15 those skilled in the art or they may be specific applications coded in a standard programming language. Further details of the functions performed by the software are provided below.

The central processor 11 allows access by the client processor to various network resources. In one embodiment, the central processor 11 also has access, via  
20 direct dial or the internet, to external data sources, such as manufacturer web pages or manufacturer programs that may be used to keep the information in the server current. A number of client processors 12 may be connected to the server at any given time, and therefore a number of different facilities or service providers may utilize the subject invention simultaneously.

25 The system 10 can also include one or more databases 13 for storing asset information. The database may be of any type generally known in the art. In one embodiment, a scaleable database (e.g., Oracle) is used to allow for expansion as the amount of information tracked increases.

These databases 13 may be integral to the central processor 11 or they may be  
30 accessible to the central processor through a computer network or other suitable communication link. The databases 13 servers operated by the system proprietor, and/or may include external databases operated by a remote entity, such as a manufacturer of an asset, that is accessible through a computer network. In one embodiment, the database 13 is comprised of a plurality of database servers, some of

which are integral to the central processor 11, and some that are located remotely from the central processor 11.

5 The client processor 12 may be any computer or computer systems used by those skilled in the art. The client processor 12 comprises a central processor unit ("CPU") and main memory, an input/output interface for communicating with various databases, files, programs, and networks (such as the Internet), and one or more storage devices. The storage devices may be disk drive devices or CD-ROM devices. The client processor 12 may also have a monitor or other screen device and an input device, such as a keyboard, a mouse, or a touch sensitive screen.

10 Client processor 12 can be used to place work orders, view asset information, input asset information, change the operational parameters of an asset, exchange data with the central processor, and/or to view and manipulate asset information. In order to enable the user to perform these functions, in one embodiment, the client processor 12 also has some software programs contained in the main memory or the storage  
15 devices that can be used by the CPU to perform the above functions. In one embodiment, a web browser such as Netscape Navigator, Microsoft Internet Explorer, Mosaic, or Lynx is included in the client processor to enable the client processor to exchange, interpret, and/or display information accessed via the Internet.

Some client processor 12 can be configured as kiosks 15 and located at one or  
20 more remote sites. The kiosks are adapted for use by service providers onsite, to access the central processor 11 to view asset information or service requests. As shown in Fig. 2, these kiosks can include a preconfigured menu which allows service providers to access the central processor 11, to enter and receive information concerning work orders 20, to check if a particular work order has been approved 21,  
25 and to check for messages 22. In one embodiment, the kiosks 15 can include magnetic or barcode readers to allow a service provider to swipe an identification card having a bar code or similar identification strip in order to obtain access to the central processing unit 12 or the kiosks 15 may require the input of a secret pin number.

In some embodiments, asset interfaces 14 are attached to assets with  
30 communications capabilities in order to monitor and/or control its performance. It is common for certain assets to have ports through which performance characteristics and/or failure signals can be obtained. It is also common for some assets to have bi-directional communication capabilities that enable the asset to be monitored and operated remotely. The asset interface 14 can be configured to communicate with the



asset and to provide a communication link between the asset and a client processor 12 or the central processor 11.

Communication technology, such as a cellular modem, any other wireless communication system, and/or a landline communication system may be used to form  
5 a communication link between the asset interface and a client processor 12 or the central processor 11 . Preferably, a wireless technology, such as Cellular Digital Packet Data (CDPD) technology is used to transfer information between the asset interface 14 and a client processor 12 or the central processor 11 . CDPD technology may both receive and transmit data quickly and efficiently with minimal error. As an  
10 alternative to or in addition to a wireless communications unit, a land-line telephone connection may also be used.

As shown in Fig. 1, a communication link exists between a client processor 12 and the central processor 11. This link can be achieved through a variety of means commonly known by those with skill in the art. The system and method of the  
15 invention may use the "World Wide Web" ("web" or "WWW"), which is a collection of servers on the Internet that utilize the Hypertext Transfer Protocol ("HTTP"). The Internet is a collection of computer networks that allows computer users to share files and other computer resources. Each computer connected to the Internet has a unique address whose format is defined by the Internet Protocol ("TCP/IP").

20 HTTP is a known application protocol that provides users access to resources, which may be information in different formats such as text, graphics, images, sound, video, Hypertext Markup Language ("HTML"), as well as programs. HTTP allows for the transmission of certain information between the client processor 12 and a server.

25 Upon specification of a link by the user, the client processor 12 makes a TCP/IP request to the central processor 11 and receives information, which may be a "web page" that is formatted according to HTML which also includes links to other pages of information. Users can also access other pages on the same or other database server by following instructions on the screen, entering certain data, or clicking on  
30 selected icons. It should also be noted that any type of selection device known to those skilled in the art, such as check boxes, drop-down boxes, and the like, may be used for embodiments of the invention using web pages to allow a user to select options for a given task.

In one embodiment, the subject invention is a web-site hosted by at least one computer in communication with the internet. This embodiment allows the subject invention to be accessed through a client computer 12 by various types of users located at geographically distributed sites. To limit access to authorized users, in one  
5 embodiment, the subject invention allows for various types of users and users at various distributed sites to have distinct levels of access. For example an enterprise or store user, in one embodiment, has full access to all assets and all pending work orders pertaining to his or her store. A service provider user has access to all assets of a type that he services and all work orders that he is responsible for fulfilling. These  
10 assets may include assets located at various distributed sites and may even include assets owned by distinct enterprises. An equipment manufacturer may have access to the assets at the various distributed sites that it manufactured.

Levels of access can be controlled by specifying securable or configurable attributes for each system user. These attributes can be specified by a system  
15 administrator, who may be an enterprise asset management company or may be with the enterprise itself. In one embodiment, the securable attributes are pre-defined based on the type of user. For example, user can have access to assets based on hierarchical levels within an enterprise. If the user is a regional manager, he will have access to assets in all of the locations of his store within his region. If the user is  
20 manager of a particular location, access may be limited to assets within that particular location.

The user's level of access can also be defined by his assigned roles and rights. Like the user's securable attributes, the user's roles and rights may be pre-specified by using a type of user, such as a "store manager." Based on the user's type, he is given  
25 certain rights and roles. In one example, the rights that are granted or denied include the right to create new users (having access at the current user's level or below), the right to add or modify assets, and the right to submit work orders.

#### **B. Asset Management**

30 The subject invention includes a system and method used to track the costs of assets and to facilitate the servicing of assets. As an initial procedure, the assets of an enterprise may be inventoried and an asset identifier created for each asset to give it a trackable identity. One method for inventorying assets is further discussed below. As shown in Fig. 3, factors to be monitored are also created to enable a determination

of asset information to be stored, and to enable differentiation of asset information. These factors may also be grouped together into factor groups in order to facilitate screening of stored asset information. In order to calculate a total cost of ownership, information such as cost of the asset, repair costs, and maintenance costs are typically stored as factors for each asset.

5 In order to track repair and maintenance costs and to monitor the servicing of assets, the subject invention includes a system and method for managing the servicing and maintenance of assets by third-party service providers or inhouse personnel. As shown in Fig. 4a, the method generally comprises generating a service request from a client computer (block 40), receiving a service request at the central processor 11 through the web site (block 41), determining a service provider (block 42), automatically transmitting to the service provider the service request and any additional asset information which may be needed by the service provider (block 43), and awaiting a response to the service request (block 44). If no response is received within a predetermined period of time, the electronic message is resent (block 43).

10 As shown in Fig. 4b, a service request from a user will generate an electronic work order 45 containing information such as the asset to be repaired, location of the asset site, the reported problem, and the asset identifier. Typically, a service request is initiated by enterprise employees located at a remote site through the use of a client computer 12. In some instances, a particular asset may have self-diagnostic programs that can determine a malfunction and generate an error signal. These assets may have asset interfaces 14 interfaced thereto enabling them to generate service requests automatically through a client computer 12.

20 In one embodiment, an identification of authorized service personnel is maintained in a database and linked to particular assets. Once a service request is processed by the central processor 11, a service provider is determined automatically by determining which service provider is linked to the particular asset and a particular geographic location, and the service provider is notified automatically via an E-mail message or other form of electronic messaging. If the service provider does not respond to an E-mail within a specified period of time, additional E-mails may be sent automatically. The E-mail can include the type of asset requiring service, the reported failure, location, contact person, and prior service history of the asset. In addition, the service provider may also obtain additional information on the asset by accessing the central processor 11 via the internet or a kiosk 15.

After a service request is completed, information pertaining to the repair or maintenance of an asset may be gathered from service providers through the web site or through a client computer 12 or a kiosk 15 and stored in the database 13. For instance, the cost of replacement parts may be inventoried in the database of the system and the service provider may choose, while at the remote location of the facility, the type of replacement part that is used. The cost of this replacement part, therefore, may be allocated to the asset that was repaired. In addition, the cost of the service charge may be ascertained based on the length of the visit of the service provider and this cost of service may be allocated to the repaired asset. The submission of information relating to the service provided can be used to trigger payment for the service.

In order to determine total cost of ownership and to monitor certain asset information, the subject invention also includes a filtering and compilation application that allows the user to filter or compile asset information located within a database 13 so that only desired information is displayed. In one embodiment, a filter operates by prompting a user through a client computer 12 to define criterion for the filtering of asset information, and submitting that definition along with the user's securable attributes, to the central processor 11. The central processor 12 then applies the criterion to the asset information and returns the appropriate data set for viewing by the user at the client.

As shown in Fig. 5, in this embodiment, a first – horizontally disposed section 51 contain sets of tabs defining separate primary categories which can be queried. A second – horizontally disposed section 52 defines subcategories of the primary categories. Selection of a category and a subcategory will cause the display of a formatted query box 50 utilized to set specific user criteria. Once the criteria has been submitted the asset information is displayed in table 53.

Since the maintenance and repair costs as well as purchase price comprise a majority of the total cost of ownership of an asset, a relatively accurate calculation can be obtained by summing up the three. Other factors such as energy costs, performance costs, and other can also be factored into the calculation if these factors are stored for the particular asset. To calculate the total cost of ownership, the total costs for maintenance and repair and the purchase price for an asset or a group of assets is compiled using the filtering procedures above and the values are summed together. In one embodiment of the present invention, the calculation is pre-

programmed into software located in the central processor 11 and the calculation is done automatically by simply selecting the function and inputting the asset identifiers.

### C. Additional Features

5           In a distributed business environment, assets may be distributed over a large geographic region in a large number of separate facilities. As shown in Fig. 6, to track these assets geographically, one embodiment includes an application for creating a Geographic Information System (GIS) map locating a particular asset or a particular group of assets. A set of queries 60 are displayed on a client processor 12  
10           pertaining to an asset or group of assets such as a particular asset type and a desired location. The central processor 11 then generates a map 61 based on the responses to these queries.

          This embodiment can also include a mapping system displaying a single enterprise facility. Icons representing certain types of assets may be dragged and  
15           dropped onto a GIS map of a particular facility in order to display the location of assets within a facility on a scaled map.

          To simplify the use of the subject invention and to maximize the options available to a user, the subject invention typically includes a compact menu structure for navigating the various functions included within the central processor 11. As  
20           shown in Fig. 4b, this menu structure may include information pertaining to the enterprise assets, the service history, and pending work orders. Because of the limited space available on the display screen of the client processor 12, it is essential that the navigational technique consume little space, while maintaining full functionality and ease-of-use.

25           As shown in Fig. 7, in one embodiment, the compact menu structure includes two narrow, horizontally-extending sections of the client display. The upper section 70 includes a tab-based menu that provides the main level of navigation and a lower section 71 that provides all the subsections within a selected main level of navigation. A subsection having further levels of subsections have a visual indicator adjacent  
30           thereto to signify as such. In one embodiment this visual indicator is an arrow 72 located beneath the subsection, selecting any subsection having further levels will cause the lower section 71 to display all the subsections in the previously selected subsection.

For example, in one embodiment, the main navigational sections (shown in Fig. 5) include, "Sites," "Service & Maintenance," "Asset Types," "Service Providers," "Manufacturers," "Reports," and "Messages." Selection of one of these main navigational sections determines what appears on the second section. For  
5 example, in one embodiment, if the "Sites" tab is selected, the second section starts off, on the left, with a "Sites" indicator. To the right of the "Sites" indicator now appears the various subsections under the Sites portion of the menu.

In another embodiment, the main navigational levels are highlighted in the upper section and are not repeated in the lower section. In this embodiment, the lower  
10 section only includes the subsection under the main navigational section. For example, in one embodiment, the subsections under "Sites" includes, "sites" and "organizations." If the user now selects "organizations," an "organizations" indicator appears in the lower section and the subsections to "organizations" appear to the right, in the lower section. In one embodiment, the subsections under "organizations"  
15 include "summary," "address," and "roster profile." If the user selected the "address" subsection, the lower section will now contain an "organizations" indicator, followed by an "address" indicator, followed by the "address" subsections. This process continues down as many levels as is needed. This menu structure allows the users to quickly and efficiently navigate between various forms and lists of the enterprise asset  
20 management system, while consuming a narrow band on the client display.

While the subject invention has been described with reference to several embodiments thereof, those skilled in the art will recognize various changes that may be made without departing from the spirit and scope of the claimed invention. Accordingly, this invention is not limited to what is shown in the drawings and  
25 described in the specification but only as indicated in the appended claims, nor is the claimed invention limited in applicability to one type of computer or computer network. Any numbering or ordering of elements in the following claims is merely for convenience and is not intended to suggest that the ordering of the elements of the claims has any particular significance other than that otherwise expressed by the  
30 language of the claims.

## CLAIMS

We claim:

1. A system for managing a plurality of assets of a plurality of distributed enterprises and allowing a user to access asset information, the system comprising:

5 a central processor; and

a database for storing asset information for the plurality of assets of the plurality of enterprises, the database in communication with the central processor; wherein the central processor tracks information relevant to managing each of the plurality of assets.

10 2. The system of claim 1, wherein the central processor includes a website hosted by at least one computer in communication with a computer network through a communication link.

15 3. The system of claim 1, further comprising a client processor in communication with the central processor through the communication link.

4. The system of claim 1, wherein the database stores asset information in the form of pages which in turn contain links to other pages.

20 5. The system of claim 1, wherein the central processor automatically generates an E-mail message to a service provider in response to a service request by the user.

25 6. The system of claim 2, wherein the client processor inputs, queries, and downloads asset information from the central processor through a web browser.

7. The system of claim 6, wherein the central processor is programmed with code for utilizing a user profile, including securable attributes, to limit access to particular asset information.

30 8. The user of claim 7, wherein the user profile specifies sites at which the user may access asset information.

9. The system of claim 7, wherein the central processor is programmed with code for organizing asset information in accordance with the user's request.
10. The system of claim 1, wherein the central processor is programmed with code for generating a GIS map locating one of the plurality of enterprise assets.
11. The system of claim 1, wherein the central processor is programmed with code for determining an appropriate service provider for a particular asset and alerting the service provider of a service request.
12. The system of claim 11, further comprising an asset interface in communication with the client processor.
13. The system of claim 12, wherein the central processor is programmed with code for establishing a communication link with the asset interface through the client processor.
14. The system of claim 13, wherein the asset interface communicates with the client processor through a wireless communication modality.
15. The system of claim 1, wherein the central processor is programmed with code to calculate a total cost of ownership for a particular asset or group of assets.
16. The system of claim 1, wherein the database includes at least one database server in communication with a computer network.
17. The system of claim 1, wherein the user is an agent of the enterprise.
18. The system of claim 1, wherein the user is a service provider.
19. The system of claim 1, wherein the user is an equipment manufacturer.



20. A system for managing enterprise assets of a highly distributed enterprise, the system comprising:

a website hosted by at least one computer in communication with a computer network;  
and

a client processor, including a web browser, in communication with the website through  
the computer network;

wherein the at least one computer tracks information relevant to determining a total cost  
of ownership for each asset.

21. The system of claim 20, and further comprising at least one database server in  
communication with the website, the database server having asset information stored therein in  
the form of pages, with some pages including links to other pages of information.

22. The system of claim 21, and further comprising a client processor in communication with  
the central processor and an asset interface in communication with the client processor.

23. The system of claim 22, wherein the website is programmed with code for  
communicating with the asset interface through the client processor.

24. The system of claim 23, wherein the asset interface includes a means for taking operative  
control of a particular asset.

25. The system of claim 20, wherein the website is programmed with code for selectively  
filtering asset information based on user specified criteria.

26. The system of claim 20, wherein the website is programmed with code for calculating a  
total cost of ownership.

27. The system of claim 20, wherein the website is programmed with code for utilizing a user  
profile, including securable attributes, to limit access to particular applications and to particular  
asset information.

28. The system of claim 20 wherein the website includes pictorial displays of each individual asset.

5 29. The system of claim 20, wherein the client processor is a kiosk located at an enterprise site.

30. A method of managing enterprise assets of a highly distributed enterprise, the method comprising:

10       creating an asset identifier corresponding to each of the plurality of assets for each individual asset;  
      specifying factors to be monitored for each asset identifier;  
      storing asset information pertaining to a factor for each asset identifier in a database;  
      receiving user specified requests for asset information from a client processor at a remote site; and  
15       transmitting the requested asset information to the client processor.

31. The method of claim 30, and further comprising the additional step of providing a web site in communication with a computer network for communicating with a client processor.

20 32. The method of claim 31, and further comprising the additional step of creating a GIS map based on the user specified request.

25 33. The method of claim 31, and further comprising the additional step of filtering asset information based on the user specified request.

34. The method of claim 31, and further comprising the additional step of calculating a total cost of ownership for an asset or a group of assets based on the user specified request.

30 35. The method of claim 31, and further comprising the additional step of inputting asset information from a client processor at a remote site.

36. The method of claim 31 wherein asset information is stored in the form of pages containing links to other pages.

37. The method of claim 31, and further comprising the additional step of filtering asset information transmitted to a particular user based on predetermined levels of access.

38. A method of generating service requests in a highly distributed enterprise to a plurality of service providers from a plurality of distributed asset sites, the method comprising:

providing a website hosted by at least one server computer in communication with a computer network, the website including a database containing asset information and service provider information;

receiving a service request at the website for an asset;

automatically selecting an appropriate service provider based on the asset to be serviced; and

generating an electronic message to the appropriate service provider requesting service.

39. The method of claim 38, and further comprising the additional steps of creating a log listing service requests, and generating additional electronic messages to the service provider if no response has been forthcoming.

40. The method of claim 38, wherein the electronic message is an E-mail.

41. The method of claim 40, and further comprising the additional step of attaching asset information onto the E-mail.

42. The method of claim 41, and further comprising the additional step of attaching a link to a web page onto the E-mail.

43. The method of claim 38, and further comprising the additional step of receiving a service report at the website from a service provider.

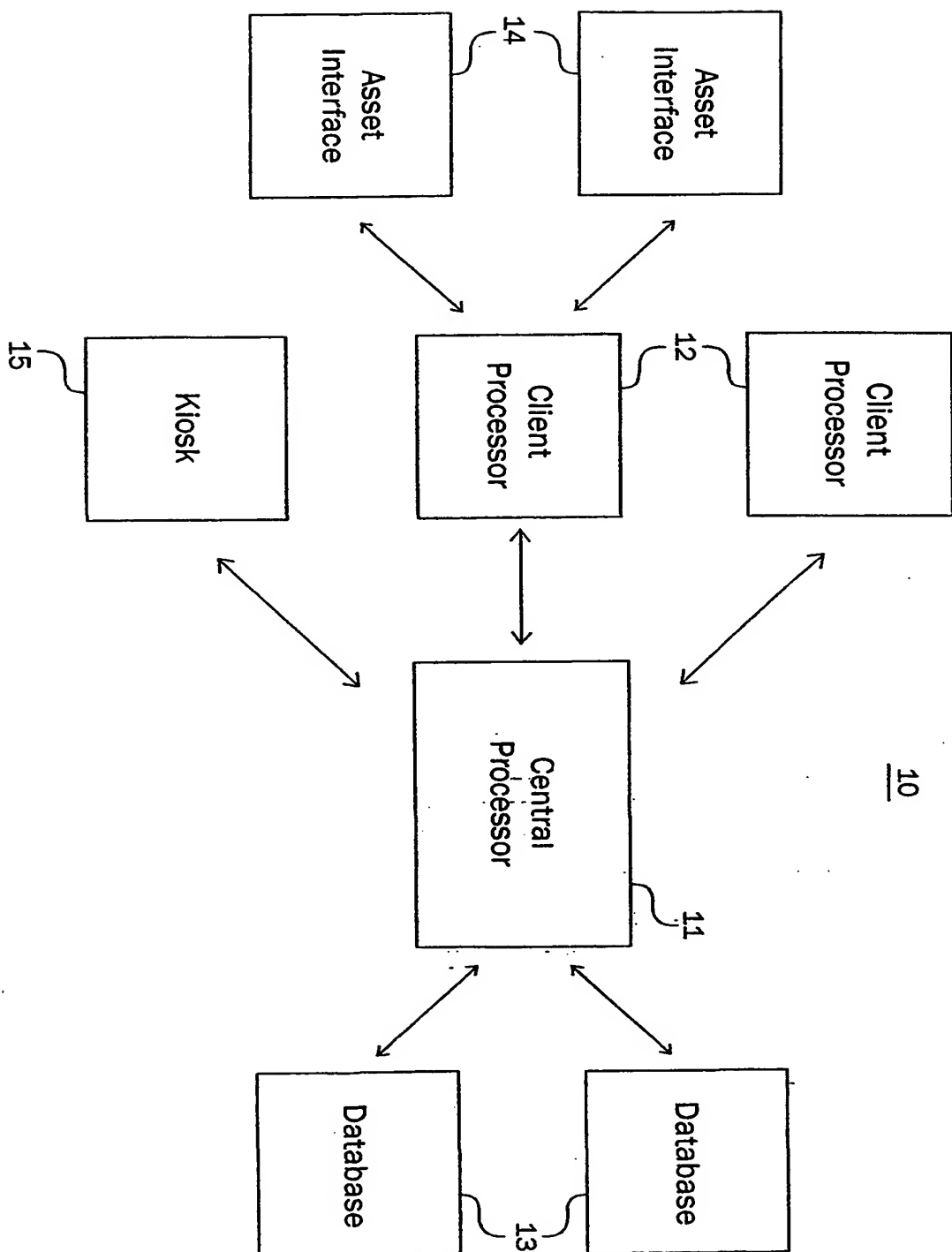
44. The method of claim 43, and further comprising the additional step of storing asset information in the service report under an appropriate factor.

5 45. The method of claim 38, wherein the service request is generated automatically by an asset interface through a client computer in communication with a computer network.

10 46. A menu structure for a software application comprising:  
a first horizontally-disposed section, the first section including a plurality of main navigational categories; and  
a second horizontally-disposed section, the second section displaying an indication of subcategories for a selected main navigational category.

15 47. The menu structure of claim 46, wherein selection of a subcategory on the second horizontally-disposed section will cause the display of a second set of subcategories on the second section.

20 48. The menu structure of claim 47, wherein the second section further includes a menu indication in visual association with each subcategory that is a menu subcategory.



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Fig. 1

**T-0664** 4175 Vinewood Lane N.

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20

21

22

Welcome

Work Orders


Approvals

Messages

Log-Out

Info

For instructions on how to use this kiosk, or for help at any time, simply touch the information button below



If you are encountering difficulties with this kiosk, please call Verisae Customer Service at 1-888-888-8888

**Western Electric TRAVEL CHARGES**

Your service provider profile indicates:

-Charge for Drive Time

-Charge for mileage from portal to portal

① Indicate travel charges, then touch Next to continue

Your drive time: (HH:MM)

00:30

+
-

Your mileage:

15


+
-


**Tom Jackson**

1 schedules work orders

Not in a service visit. Please start your service visit by entering any charge information and pressing the next button

Next





Walk Away




Fig. 2

## Verisae Roles - Master Filter Factor Groups, Factors, Values &amp; Defaults

Factor Group = A grouping of fields that are related in concept and can have one or more Factors.

Factor = A Field that we allow the user to assign a value to that will be used in filtering the information displayed in the Work Space.

Value = One of the acceptable values for any given field. Used as the value in query for the Master Filter.

Factor Groups & Factors	Value Type	Default Possible	Edit Yes / No / Down
<b>+Geography</b>			
Country	Possible Values	Blank / Show All	Yes
State/Province	Possible Values	Blank / Show All	Yes
City	Possible Values	Blank / Show All	Yes
Postal Code	Possible Values	Blank / Show All	Yes
<b>+Organizational</b>			
Client	Possible Values	Blank / Show All	Yes
Organization	Possible Values	Blank / Show All	Yes
Affiliate	Possible Values	Blank / Show All	Yes
Fact Type	Possible Values	Blank / Show All	Yes
Site	Possible Values	Blank / Show All	Yes
<b>+Service Provider</b>			
SP Organization	Possible Values	Blank / Show All	Yes
SP Site	Possible Values	Blank / Show All	Yes
Preferred (Y/N)	Possible Values	Blank / Show All	Yes
<b>+Work Order</b>			
Number	Possible Values	Blank / Show All	Yes
Status	Possible Values	Blank / Show All	Yes
Type	Possible Values	Blank / Show All	Yes
Date Created Range	Start Date, End Date	Blank / Show All	Yes
Date Completed Range	Start Date, End Date	Blank / Show All	Yes
Technician	Possible Values	Blank / Show All	Yes
Part Number	Possible Values	Blank / Show All	Yes
Service Action	Possible Values	Blank / Show All	Yes
Billable Labor Range	Low Value, High Value	Blank / Show All	Yes
Work Order Cost Range	Low Value, High Value	Blank / Show All	Yes
<b>+Service Visit</b>			
Number	Possible Values	Blank / Show All	Yes
Number of Trips	Possible Values	Blank / Show All	Yes
Service Visit Cost Range	Low Value, High Value	Blank / Show All	Yes
<b>+Invoice</b>			
Number	Possible Values	Blank / Show All	Yes
Status	Possible Values	Blank / Show All	Yes
Date Created Range	Start Date, End Date	Blank / Show All	Yes
Invoice Cost Range	Low Value, High Value	Blank / Show All	Yes
<b>+Assets</b>			
Asset Type	Possible Values	Blank / Show All	Yes
Work Center	Possible Values	Blank / Show All	Yes
In Service Date Range	Start Date, End Date	Blank / Show All	Yes
Warranty Expiration Date Range	Start Date, End Date	Blank / Show All	Yes
Preventative Maintenance (Y/N)	Possible Values	Blank / Show All	Yes
<b>+Manufacturer</b>			
Manufacturers Site	Possible Values	Blank / Show All	Yes
<b>+Calls</b>			
Call Status	Possible Values	Blank / Show All	Yes
Action Type	Possible Values	Blank / Show All	Yes
Reason Type	Possible Values	Blank / Show All	Yes
Call Date Range	Start Date, End Date	Blank / Show All	Yes

Fig. 3

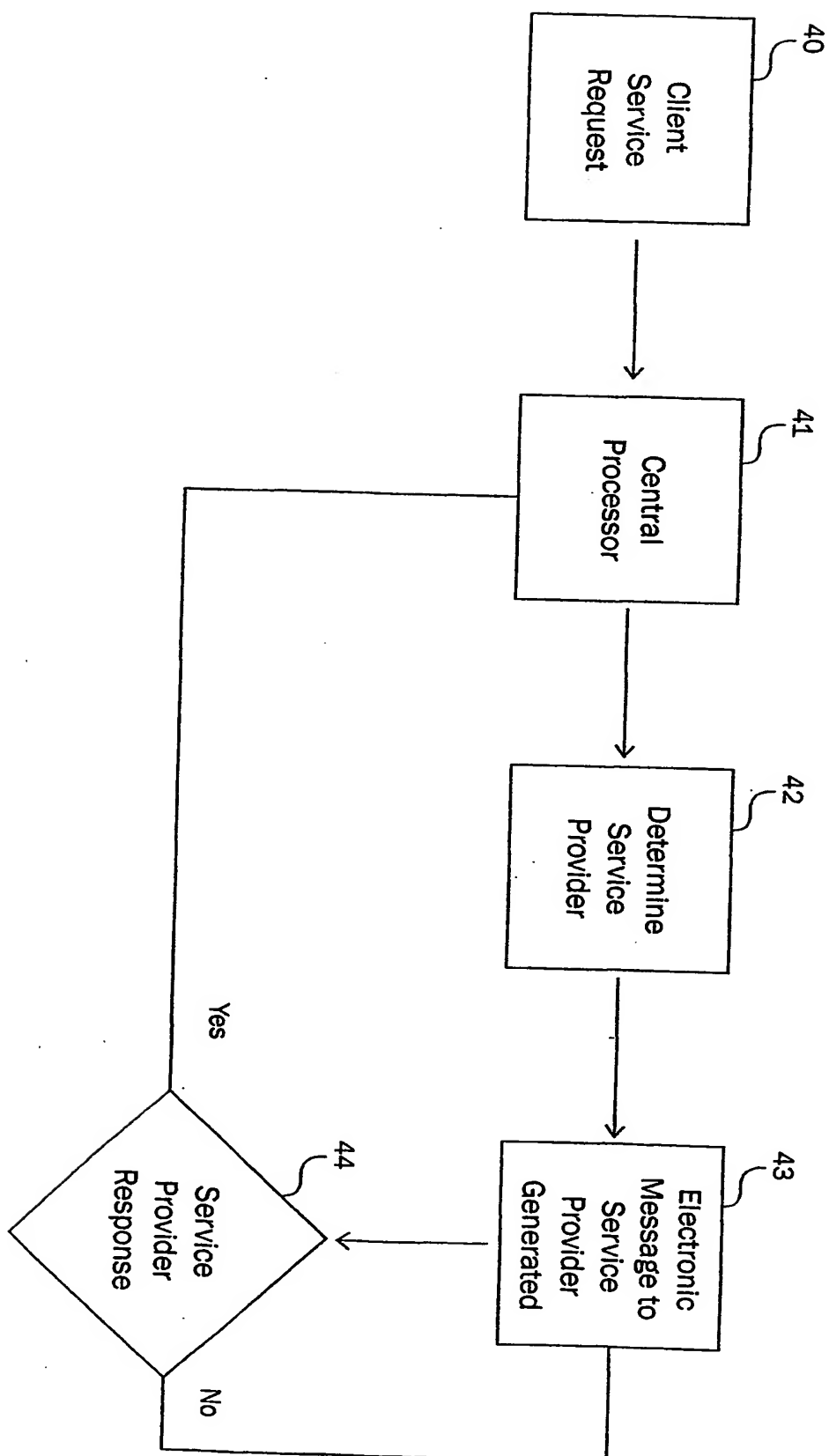


Fig 4A



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Active Call																																											
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Site</td> <td style="width: 70%;">T-0664</td> </tr> <tr> <td>Requester</td> <td>Terry Haughton</td> </tr> <tr> <td>Description</td> <td>Lack of power, Battery appears not be charging</td> </tr> <tr> <td>Reason Type</td> <td>Out of Service</td> </tr> <tr> <td>Asset Type</td> <td>Dane QuickKart 4000</td> </tr> <tr> <td>Asset Number</td> <td>1854</td> </tr> <tr> <td>Serial Number</td> <td>0059</td> </tr> <tr> <td>Action Type</td> <td>Create Work Order</td> </tr> <tr> <td>Status</td> <td>Open</td> </tr> </table> <div style="text-align: right; margin-top: 10px;"> <input type="button" value="Save"/> <input type="button" value="WO"/> <input type="button" value="New"/> </div>	Site	T-0664	Requester	Terry Haughton	Description	Lack of power, Battery appears not be charging	Reason Type	Out of Service	Asset Type	Dane QuickKart 4000	Asset Number	1854	Serial Number	0059	Action Type	Create Work Order	Status	Open	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2" style="text-align: center;">Workspace    Filter Definition</td> </tr> <tr> <td style="width: 30%;"> <input type="button" value="Site"/> <input type="button" value="Service &amp; Maintenance"/> <input type="button" value="Asset Types"/> <input type="button" value="Service Providers"/> <input type="button" value="Manufacturers"/> <input type="button" value="Reports"/> <input type="button" value="Messages"/> </td> <td style="width: 70%;"> <input type="button" value="All Work Orders"/> <input type="button" value="Summary"/> <input type="button" value="New Work Order"/> </td> </tr> <tr> <td colspan="2" style="text-align: center;">New Work Order</td> </tr> <tr> <td style="width: 30%;">Site Name</td> <td style="width: 70%;">T-0664</td> </tr> <tr> <td>Requester</td> <td>Terry Haughton</td> </tr> <tr> <td>Asset Type</td> <td>Dane QuickKart 4000</td> </tr> <tr> <td>Verisae Tag Number</td> <td>1854</td> </tr> <tr> <td>Work Order Name</td> <td>Lack of Power, Batt</td> </tr> <tr> <td>Work Order Description</td> <td>Lack of Power, Battery appears not be recharging</td> </tr> <tr> <td>Due Date</td> <td>02/01/2001</td> </tr> <tr> <td>Service Provider</td> <td>Western Electric</td> </tr> <tr> <td>Technician</td> <td></td> </tr> </table> <div style="text-align: right; margin-top: 10px;"> <input type="button" value="Save"/> <input type="button" value="Cancel"/> </div>	Workspace    Filter Definition		<input type="button" value="Site"/> <input type="button" value="Service &amp; Maintenance"/> <input type="button" value="Asset Types"/> <input type="button" value="Service Providers"/> <input type="button" value="Manufacturers"/> <input type="button" value="Reports"/> <input type="button" value="Messages"/>	<input type="button" value="All Work Orders"/> <input type="button" value="Summary"/> <input type="button" value="New Work Order"/>	New Work Order		Site Name	T-0664	Requester	Terry Haughton	Asset Type	Dane QuickKart 4000	Verisae Tag Number	1854	Work Order Name	Lack of Power, Batt	Work Order Description	Lack of Power, Battery appears not be recharging	Due Date	02/01/2001	Service Provider	Western Electric	Technician	
Site	T-0664																																										
Requester	Terry Haughton																																										
Description	Lack of power, Battery appears not be charging																																										
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Workspace    Filter Definition																																											
<input type="button" value="Site"/> <input type="button" value="Service &amp; Maintenance"/> <input type="button" value="Asset Types"/> <input type="button" value="Service Providers"/> <input type="button" value="Manufacturers"/> <input type="button" value="Reports"/> <input type="button" value="Messages"/>	<input type="button" value="All Work Orders"/> <input type="button" value="Summary"/> <input type="button" value="New Work Order"/>																																										
New Work Order																																											
Site Name	T-0664																																										
Requester	Terry Haughton																																										
Asset Type	Dane QuickKart 4000																																										
Verisae Tag Number	1854																																										
Work Order Name	Lack of Power, Batt																																										
Work Order Description	Lack of Power, Battery appears not be recharging																																										
Due Date	02/01/2001																																										
Service Provider	Western Electric																																										
Technician																																											

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Fig. 4B

6/8

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**Active Call**

Site: T-0664 ☐

Requister: Terry Haughton ☐

Description: Lack of power. Battery appears not be charging ☒

Reason Type: ☐

Out of Service: ☐

Asset Type: ☐

Dane Quickart 4000 ☐

Asset Number: 1894 ☐

Serial Number: 0059 ☐

Action Type: ☐

Creed Work Order: ☐

Status: ☐

Open ☒

Save WO New

---

**Workspace Filter Definition**

Sites Service & Maintenance Asset Types Service Providers Manufacturers Reports Messages

> Outstanding Work Orders Approvals All Work Orders Service Calls Invoices Payables Generate PM Work Orders

**All Work Order**

Status	Site Name	Work Order#	Work Order Name	Asset Type	Service Provider
Due 01/29/2001	T-0001	71	LF Tire out of align	Dane Quickart 4000	Western Electric
Due 01/27/2001	T-0024	72	Wheels locked	Dane Quickart 4000	Western Electric
Due 01/28/2001	T-0100	73	the qt is broke	Dane Quickart 4000	Western Electric
Invoice	T-0100	63	Remote intermittent	Dane Quickart 2000	Western Electric
Overdue	T-0100	62	Left tire flat	Dane Quickart 2000	Western Electric
App	T-0100	59	Remote not working	Dane Quickart 2000	Western Electric
Invoice	T-0100	64	Remote not working	Dane Quickart 2000	Western Electric
Due 02/01/2001	T-0664	74	Lack of power, Batt	Dane Quickart 4000	Western Electric
App	T-0664	67	Quick Kart is broken	Dane Quickart 4000	Western Electric
Rejected	T-0664	68	Remote broken	Dane Quickart 4000	Western Electric
Inv. Rend	T-0664	58	Lift strut leaking h	Crown Walkie Stackr	Morrison West
Appy Rend	T-0664	61	Steering wheel loose	Dane Quickart 4000	Morrison West
Invoice	T-0664	60	Rear hitch broken	Dane Quickart 4000	Western Electric
Appy Rend	T-0664	65	Remote not working	Dane Quickart 4000	Western Electric
Appy Rend	T-0664	66	Flat tire	Dane Quickart 4000	Western Electric

Show all 7 Groups of 15 Next 2

Now

Veriase Enterprise Asset Management & Maintenance System

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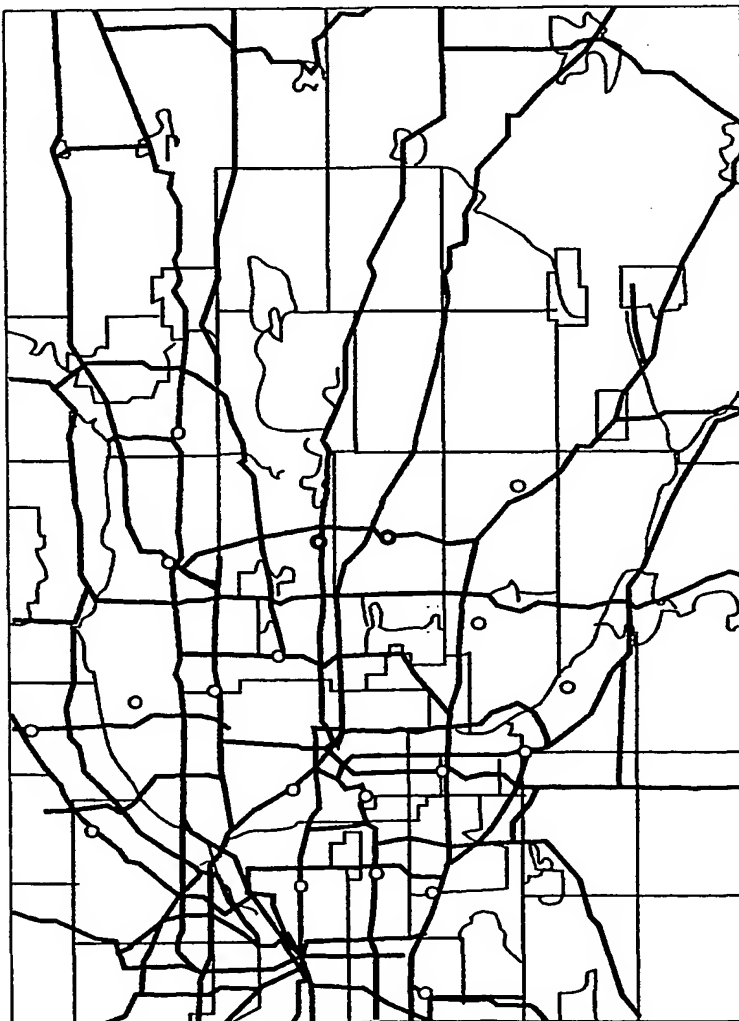
53

Fig. 5

Stores in Hennepin County Minnesota

Workspace GIS Mapping

Please click on the map to select a store. (The YELLOW points are sites which meet your criteria)



There are 10 stores located in the Hennepin County. Of which, 2 stores meet your criteria.

Qualified Sites

T-0664	<input checked="" type="checkbox"/>	Select
T-0100	<input type="checkbox"/>	
T-0664	<input type="checkbox"/>	

Verisec Enterprise Asset Management & Maintenance System

Active Call	
Site	<input type="text"/>
Minnesota	<input checked="" type="checkbox"/>
Asset Type	<input type="text"/>
Cart	<input checked="" type="checkbox"/>
Operand	<input type="text"/>
Equals	<input checked="" type="checkbox"/>
Number of Assets	<input type="text"/>
1	<input checked="" type="checkbox"/>
Affiliation	<input type="text"/>
Greatland	<input checked="" type="checkbox"/>
<input type="button" value="Submit"/>	

Fig. 6

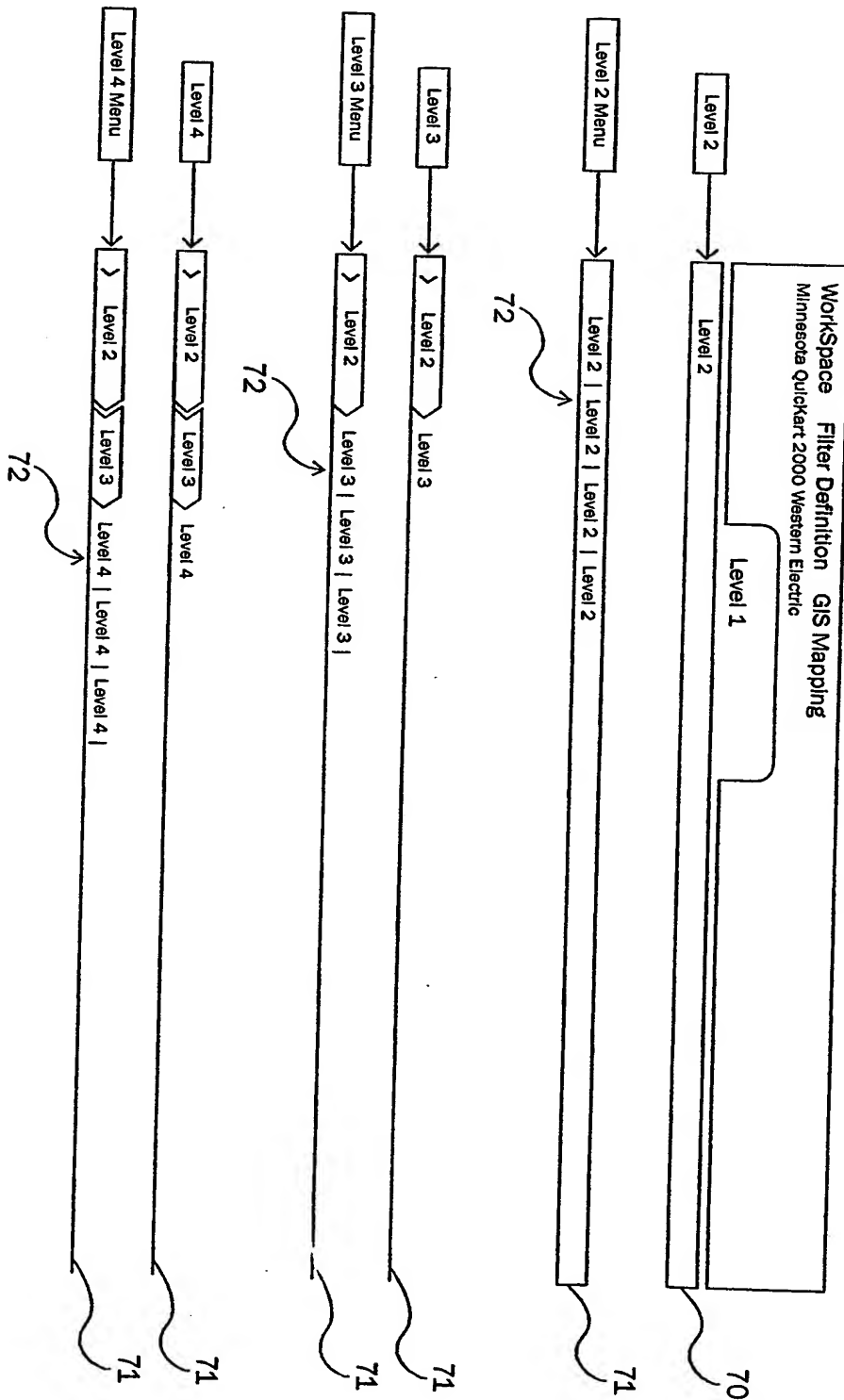


Fig. 7

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US01/19491

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G06F 17/60, 13/10, 13/12, 9/44, 9/45, 15/173, 15/16  
US CL : 703/21, 22; 709/201, 218, 220, 223; 705/28, 22, 8

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 703/21, 22; 709/201, 218, 220, 223; 705/28, 22, 8

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
Please See Continuation Sheet

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,845,265 A (WOOLSTON) 01 December 1998 (01.12.98), Abstract, Figures 1-13, col. 1, lines 34 et seq.	1-48
X	US 5,946,662 A (ETTL et al.) 31 August 1999 (31.08.1999), Abstract, Figures 1-7, col. 1, lines 56 et seq.	1-48
X	US 5,980,090 A (ROYAL, Jr. et al.) 09 November 1999 (09.11.1999), Abstract, 1-7B, col 2, lines 8 et seq.	1-48
X	US 5,821,937 A (TONELLI et al.) 13 October 1998 (13.10.1998), Abstract, Figures 1-56, col. 2, lines 25 et seq.	1-48
X	US 5,831,610 A (TONELLI et al.) 03 November 1998 (03.11.1998), Abstract, Figures 1-45, col. 2, lines 10 et seq.	1-48
X	US 5,758,126 A (DANIELS et al.) 26 May 1998 (26.05.1998), Abstract, Figures 1-6, col. 2, lines 41 et seq.	1-48
X	US 5,748,956 A (LAFER et al.) 5 May 1998 (05.05.1998), Abstract, Figures 1-7, col. 2, lines 50 et seq.	1-48
X	US 5,537,313 A (PIRELLI) 16 July 1996 (16.07.1996), Abstract, Figures 2-4B, col. 4, lines 26 et seq.	1-48
X	US 5,752,244 A (ROSE et al.) 12 May 1998 (12.05.1998), Abstract, Figures 1-21, col. 1, lines 62 et seq.	1-48

☒ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"B" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"

document member of the same patent family

Date of the actual completion of the international search

08 September 2001 (08.09.2001)

Date of mailing of the international search report

23 NOV 2001

Name and mailing address of the ISA/US

Commissioner of Patents and Trademarks  
Box PCT  
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Authorized officer

Kevin Teska

Telephone No. 703-305-9704

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US01/19491

## C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,923,850 A (BARROUX) 13 July 1999 (13.07.1999), Abstract, Figures 1-1B, col. 2, lines 66 et seq.	1-48

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US01/19491

**Continuation of B. FIELDS SEARCHED Item 3:**

IEEE, ACM and EAST Databases

search terms: asset, management, inventory, optimize, internet, enterprise, network

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US01/19491

## Box III TEXT OF THE ABSTRACT (Continuation of Item 5 of the first sheet)

The technical features mentioned in the abstract do not include a reference sign between parentheses (PCT Rule 8.1(d)).

### NEW ABSTRACT

A system (11) and method for managing enterprise assets (14) located at geographically distributed sites. The method includes storing in a database (13) information relating to each asset, wherein the stored information includes cost of each asset and cost of service for each asset. The method further includes tracking and storing information relating to servicing of the assets, including cost of servicing. Information relating to the assets is then displayed to at a user of the system at client processors (12).